ARCHIVES OF OPHTHALMOLOGY.

ON PUERPERAL SEPTIC EMBOLISM OF THE EYE.

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(*Fig.* 1, *Plate V.*)

THE ophthalmologist has but few opportunities of observing cases of metastatic uveitis. My own observations embrace nine eyes in six individuals, of which I shall here describe the last case. This was observed by Dr. Litten and myself from beginning to end, and afterward examined anatomically.

Mrs. G., æt. 34, recovered from her third delivery June 14, 1879, without medical assistance. The hemorrhage was excessive, and the lochia were tinged with blood for a fortnight. The patient left her bed on the tenth day, and resumed her household duties. On the sixteenth day, July 1, 1879, she was attacked with a rigor, while the lochial discharge, which had already become slight, reappeared more abundantly and was offensive. Rigor followed rigor, pain was felt in various joints, and on the night from July 3d to 4th, in the right eye. July 4th, the patient was received into the hospital.

Present condition.—The patient is pale and listless. Her right knee joint and left forearm are swollen and painful. The uterus is as large as a fist, and anteverted; its discharge reddish. The urine contains some albumen. The sounds of the heart are dull and muffled. Temperature 38.5°—39.9° C. Pulse 100, and weak. Respiration 40, costal, dull, and slightly dyspnoic. The condition of the eyes will be stated later.

The treatment consisted in quinia, ice-bags, etc. July 8th, delirium ensued, and the affections of the joints became more numerous and more marked. Puncture of the knee joint and of the

subcutaneous abscess revealed *abundant bacteria in the freshly evacuated pus.* The white blood corpuscles were also increased. July 12th, a loud rattling appeared. Death followed, July 15th; *i. e.*, thirty-two days after delivery, sixteen days after the beginning of the puerperal affection, and eleven days after the appearance of the affection on the part of the eyes.

Abstract of the report of the autopsy:

Stat. puerperalis, XXXII dies. Parametritis et metritis phlebitica. Phlegmone telae adiposae pelvis et cystidis. Pyelitis et nephritis metastatica duplex. Gonitis suppurativa metastatica. Pleuritis fibrinosa duplex. Bronchitis, pneumonia catarrhalis lobi inferioris sinistri, inferioris et medii dextri. Endocarditis parietalis metastatica sinistra. Degeneratio adiposa myocardii. Hyperplasia levis lienis. Pachymeningitis haemorrh. dextra. Exostoses calvariae.

By the kindness of the attending physician, I had many opportunities of examining the eyes of the patient during her illness. July 5th, P.M., thirty-six hours after the patient had been awakened by violent and sudden pain in her *right* eye, I found the left eye *normal in every respect.* The right eye showed slight chemosis and hyperæmia of the lower portion of the conjunctiva; cornea transparent. A semilunar, whitish-yellow hypopyon concealed the lower half of the iris.* The pupil enlarged moderately—7 *mm.*—under atropia, and was perfectly round. The centre of the pupil was occupied by a round, grayish, disc-shaped exudation, 3 *mm.* in diameter, resting on the anterior capsule, and thickened at its centre.† A ring, about 2 *mm.* broad, lay open between the edge of the exudation and the pupillary edge, appeared black to the naked eye, and still showed the red reflex when illuminated by the mirror. The eye affected barely counted fingers at 2′.

* It is comparatively easy to see how the inflammatory symptoms, which seem slight to the naked eye, as well as the brilliant color of the hypopyon, misled the ancients into the belief that these were cases of metastasis of milk (Hypogala) into the anterior chamber. Still, it is very difficult for us to imagine, in these days, the foundation for the assertion of Jüngken (*Augenhlkde.*, Berlin, 1836, "On ophthalmia puerperalis") that "the ocular chambers suddenly fill, or become partially filled, with milk, so that vision is lost so long as the milk remains *in situ.* This is a genuine metastasis of milk to the eye, but it disappears as rapidly as it came, and is often repeated during the inflammatory condition of the eyes. The prognosis is favorable." Beer (*Augenhlkde.*, 1871, Band ii, page 572) admits a vicarious amaurosis, when the secretion of milk in puerperal women has been suddenly suppressed (with slight iritis and turbity of the refracting media of the eye), but declares that he has never yet seen an exudation of milk into the chambers of the eye.

† I have frequently observed this peculiar state of the exudation, with a relatively free pupillary edge in the beginning of puerperal metastatic ophthalmia. Compare *Klin. Beobacht.*, Wien., 1874, page 53.

The partial translucency of the pupil, and the remnant of vision—thirty-six hours after the beginning of the puerperal metastatic affection of the eye—are rather unusual, and might seem to imply that only a relatively small vessel of the fundus oculi had been plugged by the septic embolus.

July 6th. The changes have increased considerably. The patient lies in a rigor; the *right* eye is now *totally* blind. The swelling and hyperæmia of the bulbar conjunctiva are about as before. The cornea, however, is cloudy, and the aqueous slightly turbid. The hypopyon is no larger, but the iris is covered with a coherent layer of exudation; the pupil completely occluded, irregular, and no longer illuminable; the edge of the pupil is tied to the anterior capsule by a firm, grayish-white stripe. The *left* eye shows no external changes, but has become *almost* blind. While on the evening before it possessed complete vision, it can now only count fingers held directly before it.

While on the evening before, the refracting media of the left eye had been perfectly clear, and its fundus unaltered, I now saw a large, black, brush-like opacity (composed as it were of fine fibres) in the upper part of the vitreous, which was, moreover, filled with very fine, uniform opacities. The entrance of the optic nerve could barely be distinguished. *A medium-sized hemorrhagic spot, with a grayish-white contour was discovered in the retina.* This was, therefore, a case of *fresh, septic embolism* of a small retinal vessel.

July 7th. Total blindness in both eyes; the iris of the left eye also is now covered with a dense layer of exudation.

July 8th, hypopyon appeared, and *small hemorrhagic spots on both conjunctivæ.*

July 11th. S=o, in both eyes; slight chemosis with moderate congestion of the vessels leading downward; cornea cloudy; both pupils occluded by a dense exudation, while a thinner layer of exudation extends over the iris. The hypopyon has disappeared; T diminished. This condition continued until the death of the patient.

The right eye was at once opened, the retina found to be destroyed by suppuration, and the vitreous infiltrated with pus. The left globe was carefully enucleated, hardened in Müller's solution, and opened Nov. 14, 1879, by a horizontal section (see Fig. 1, Plate v).

The specimen offers a fine example of septic-embolic inflammation of the retina. The cornea, sclera, and choroid are normal, as well as the optic nerve and its sheaths. The fibrous structure of the orbital portion of the optic nerve, the line at which (within the sclerotic canal) the myelin sheaths of the optic-nerve fibres cease, and a small piece of transparent optic-nerve tissue on the papilla, are all clearly visible. But the anterior layers of the papilla are thickened and infiltrated with pus, and pass directly over into the *retina* (2.2), which also is excessively thickened and infiltrated with pus. The retina is separated from the slightly thickened *choroid* (6) with its pigment-epithelial cells, by a *space* (5) which, during life, was evidently filled with an aqueous fluid. A thin and imperfect layer of pus rests upon the pigment-epithelial layer of the choroid. The purulent infiltration of the retina passes farther forward. The ciliary body, which is but slightly thickened, is covered with an adherent, thick, and dense *layer of pus* (7), a thinner layer of which, extends over the equator of the lens and along its posterior surface, without, however, reaching its posterior pole.

The *vitreous body* (3) is condensed, but can be easily separated from the retina by a needle, and, at a short distance behind the lens, contains a small *cyst* (4) filled with watery fluid. The iris is thickened and grayish, and covered with a yellow layer of exudation which occludes the pupil. The anterior chamber is partially filled with a less spongy mass (hypopyon). The posterior surface of the iris is united to the anterior capsule by a grayish exudation, which uninterruptedly passes over into the deposits on the inner surface of the ciliary body.

The results of the *microscopic* examination are, in brief:

The *retina* (2) is the seat of the most important alterations. Its whole expanse is thickly infiltrated with cells and fibrils of coagulation, and it is cloudy and thickened throughout. It is very difficult to discern in the retina more than three layers. In the right half of the specimen especially, we can distinguish two thick layers, which are very adherent to the inner surface, but do not directly

appertain to it :—(*a*) a closely-packed *layer of granular pus cells ;* (*b*) between (1) and (2) a reticulated, fibrous, cellular layer, which looks like a deposit of fibrin. Prolongations of the layer of pus can be followed even up to a few retinal vessels which are filled with a discolored substance.*

The orbital portion of the optic nerve is but little changed under the microscope. The vitreous body exhibits the development of a thick fibrous network with numerous round cells. The choroid is not thickened, but filled with round cells, while its ramifying pigment cells have remained intact. The cellular layer of the pigment-epithelial cells is occasionally perforated, and the retina more intimately united with the choroid; the latter has undergone greater alterations, and is slightly thickened. The perichoroidal lymph space is at places distinctly enlarged, and filled with a fine fibrous network (fibrin). A similar but coarser network, which is interspersed with a few stiff, broader bands (zonula), fills the pyramidal space between the equatorial portion of the lenticular capsule, the ciliary processes, the uveal layer of the iris, and the thick layer of pus which projects as the continuation of the above-mentioned purulent shell (1) from the ciliary body upon the posterior surface of the lens. The pars ciliaris retinæ upon the ciliary processes is easily to be recognized, and is but little altered.

A layer of fibrin unites the uvea of the iris with the anterior capsule, and forms the direct continuation of the fibrinous network which fills the so-called Petit's canal. The anterior surface of the iris is covered by a thicker fibrinous layer, which ends abruptly in a point in front of the angle of the iris, and contains round cells, some of which are pigmented. Schlemm's plexus of veins is open.

Whoever searches for emboli of the retinal vessels under the above-named circumstances, must remember that the embolic material consists of bacteria—of a mass which has been swept away from any given portion of the body into the veins, has passed the capillaries of the lungs, and then been driven onward by the arterial current into any given

* This condition seems so much the more important, as the layer of pus in front of the retina and following it concentrically, was also observed by O. Becker. (See below.)

portion of the body. The embolic nature of the intra-ocular process was demonstrated twenty years ago by Virchow, lately confirmed by Roth, and the bacterial embolic material recognized by Heiberg and Litten. But little weight is to be attributed to a few negative conditions, chiefly in the later stages of the disease, because it is then so difficult to prove the presence of bacteria.

Whoever has made such observations will not deny the embolic nature of metastatic ophthalmia.

Simple embolism of a retinal artery causes instantaneous blindness of the eye affected, with the well-known ophthalmoscopic picture (thread-like retinal arteries, gray œdema of the retina, and a red spot in the centre of the retina, produced by optical contrast), and terminates in atrophy of the optic nerve and retina. *Septic embolism*, whether of a retinal or choroidal artery, causes rapid disturbance of vision, usually accompanied with immediate haziness of the fundus oculi, and terminates in purulent inflammation of the retina, vitreous, choroid, iris, etc. Septic embolism of a very small branch may leave a remnant of vision for a few hours, or even days, until suppuration gains the upper hand in the fundus oculi, and total blindness ensues; simple embolism of the same branch could not, perhaps, be diagnosticated.

I still cling, in agreement with former observers, to the same morbid picture of septic embolism of the fundus oculi, which I published in the *Centralbl. f. Augenhlkde.*, 1878, page 173.

This peculiar affection of the eyes, accompanied occasionally with violent pain in the globes, originates suddenly in puerperal patients, whether preceded by a birth or an abortion, and sometimes, though less frequently in other pyæmic cases. Vision is at once impaired, the vitreous becomes hazy, and the fundus oculi veiled. Even a few hours after the beginning of the attack, we find either total blindness of the eye affected, or excessive diminution of sight, so that fingers can barely be counted when held close before the eyes. It is usually difficult in this early stage (and especially in those unfortunate cases where the second eye is

affected a short time after the other) to diagnosticate between retinal and choroidal embolism; but this is a matter of indifference, in so far as concerns the further progress of the case. For on the first or second day, rarely later, the inflammation spreads rapidly over the whole uveal tract, and comes into sight in the anterior chamber. A dense, projecting exudation in the pupillary field, a distinct deposit of pus on the floor of the anterior chamber (so-called hypopyon ciliare), while the pupil still yields relatively well to atropia, and chemosis, with pericorneal injection, appear rapidly after blindness has ensued. The iris participates more and more in the affection, and the globe protrudes. Ulceration of the cornea, or rupture of the sclerotic leads finally to atrophy of the globe, which is thus absolutely destroyed if death *has not previously cut short the progress of the disease.*

The affection of the eyes usually occurs in the second or third week after delivery (according to Mackenzie, from three to thirty days). The second eye may remain unaffected, or be attacked after a short interval, a day or two, or only several weeks after the other, after a relatively free interval of the constitutional symptoms, simultaneously with the final symptoms. The disease is usually double, which is easily explained by the abundance of septic material circulating in the blood, and from the fact that even very minute particles may migrate to the eye, and develop their deleterious action. (It is, however, much rarer to meet with double than unilateral simple embolism of the retinal arteries, in individuals with valvular insufficiency or arteriosclerosis.)

The *prognosis* of puerperal metastatic inflammation of the eyes is always unfavorable. All the patients that I have seen, died, although, at the time of the affection of the eyes, the constitutional symptoms did not seem threatening. Death ensued in all of the cases observed by Hall and Higginbottom, who were the first to give an accurate description of the affection of the eyes (1829). The same is the case in all exact observations so far reported. Typical cases, however, have been reported, where the patients re-

covered; *e. g.*, one by E. Martin (*Zeitschr. f. Geburtsch.*, Band ix), a case of artificial delivery, metrophlebitis, metastatic choroiditis of the right eye (diagnosticated by v. Graefe), gangrene of the pelvic cellular tissue; *cure*, with unilateral blindness.

In other pyæmic affections in which the eye is attacked with septic embolism, life is dangerously threatened, but there is a larger percentage of recovery, with permanent blindness (single or double), than in the puerperal form.

As regards the *therapeutics* of this terrible disease of the eyes, there is but little to say; we may soothe the violent pain by instillations of atropia, and by warm fomentations. We sometimes have to open the bulbar abscess, as once happened to myself in a case of metastatic inflammation of the eye, caused by disease of the heart.

Finally, I will briefly mention the *literature* of this affection, and mention first of all, that in many old treatises, even before the publication of Virchow's works on embolism, we meet with much clearer views on this disease, than in some modern ophthalmological works. We first have Hall and Higginbottom's paper (*Medico-chirurg. Transactions.* London, 1829. Vol. xv, page 120) on six cases of puerperal ophthalmia, destroying the eyes and ending fatally; then J. N. Fischer (*Lehrbuch der gesammten Entzündungen*, etc., *des mensch. Auges.* Prag. 1846. Page 285) has accurately described the morbid picture of "Choroiditis metastatica." Rüte (*Lehrbuch.* 1845. Page 540, *et seq.*) gives a very readable chapter on "Ophthalmia metastatica e phlebitide" (Phlebitis choroideæ). v. Arlt (*Lehrbuch*, 1853, Band ii, pp. 209–210; 167–169) also contributes an exhaustive description of the clinical picture and post-mortem condition, only, as is evident from the date of his publication, he does not suggest embolism as the cause, and has no ophthalmoscopic image to offer. He locates the starting-point of the disease in the choroid. This view still finds supporters, although Virchow's doctrines of embolism have so materially changed our ideas of the morbid process; we commonly regarded such cases as embolism of the ciliary arteries. Owing to this prejudice, Roth's papers on "Retinitis

septica" did not meet with the reception which they de served, and yet from what has been said, it seems probable that the retina, as well as the choroid, or both at once, or even occasionally the iris (Leber, M. Landesberg), may furnish the primary location for the septic embolism.

Amongst the causes of "pyæmic choroiditis," v. Arlt mentions (in relative frequency) puerperal affections, omphalophlebitis of new-born children, surgical operations, accidental wounds and caries, when phlebitis ensues. (Acute endocarditis should also be included.)

Mackenzie's chapter on "Ophthalmia phlebitica" * (*Treatise*, etc.) is masterly. All detailed references to modern hand books and treatises are omitted in this paper, in order to spare the reader's patience.

In 1856, Virchow published (His *Archiv*, Band ix, 307; Band x, 175) his pioneer discovery of embolic diseases, and showed that the so-called ophthalmia metastatica (panophthalmitis) could start as well from the retina as from the uveal tract. Leber, "on affections of the retina" (Graefe-Sæmisch, Band v, 502, *et seq.*), gives a full list of all cases of this affection published up to date (1877) by Meckel, H. Müller, Bowman, Knapp, H. Schmidt, Nettleship, Roth, and Heiberg.

The latest cases can be found in *Centralb. f. Augenhlkde.*, 1877, page 23 of September supplement (Litten); 1878, page 39 (Landesberg); page 112 (Beck); page 173 (Bryant); and Becker (*Atlas der Pathol. Topographie des Auges*, Heft ii; page 82, 1878) has described a case of double choroiditis metastatica after an amputation, and given an excellent picture of the section of the globe, which much resembles the one I here offer: only in Becker's case the choroid is much more diseased, and the process further advanced.

* Mackenzie has been indirectly, but, as it seems to me, unreasonably blamed, for extending the ætiology of ophthalmia phlebitica so far as to include all possible feverish affections as a cause. (Graefe's *Archiv*, Band xviii, 1, page 28.) For he distinguishes between ophthalmia metastatica and ophthalmia postfebrilis, * * * the latter being evidently from his description what we now call iridocyclitis plastica, after recurrent fever.

ON FOREIGN BODIES IN THE INTERIOR OF THE EYE, WITH SOME REMARKS ON OPTICO-CILIARY NEUROTOMY.

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(*With Figures 3–6 on Plate V.*)

Case 1.—*Splinter of metal in the fundus oculi, with preservation of vision.*

The December (1879) number of the Ophthalmic Hospital Reports contains a case reported by Mr. Snell of Sheffield, in which a particle of steel lay near the optic nerve, in the fundus of the eye, "with preservation of perfect vision." Additional mention was made that similar cases had never before been reported. This last remark is, however, not quite exact.

Compare: A. v. Graefe, *Arch. f. O.*, *Band* III, 2, pag. 337.
" Jacobson, " " " XI, 1, " 129.
" Jacobi, " " " XIV, 1, " 138.
" Hirschberg, *Klin. Beobacht.*, pag. 103.
" " *Berl. Klin. Wochensch.*, 1875, No. 22, etc.

The following similar case lately came under our observation:

December 29, 1879.—A workman, æt. 27, reported that six weeks ago, while cutting iron, something had flown into his right eye. The sight at once became affected, and inflammation followed; a

spot of blood could be seen on the white of the eye, on the temporal side.

The left eye is now normal in every respect, and the right eye free from external irritation. S. $\frac{15}{200}$ and Sn. 2 is read at 5″. The bulbar conjunctiva is not reddened, but is slightly chemotic. A small white line in the sclera, which might be taken for a penetrating scar, is visible just in front of the equator of the eye, in the horizontal meridian, and laterally from the margin of the cornea. The refracting media are clear; the nasal half of the optic papilla is hazy, and the vena nasalis superior completely obliterated over a short space. A bolt-like foreign body rests firmly in the retina at a short distance from the nasal margin of the papilla. The foreign body lies encapsuled in a snow-white investing membrane of connective tissue, which also covers the free anterior terminal surface, but in such a way that the temporal edge of the latter projects as a coal-black, foreshortened zone, and from a few points throws off a metallic reflex. A circumscribed cloudiness of the retina extends from the location of the foreign body, and with its projections completely hides the above-mentioned vein. The end of the foreign body projects 0.6—0.75 *mm.* above the papilla, by measurements in the erect image.

The limits of the visual field are normal, but the blind-spot is much enlarged, and a large scotoma* is developed, corresponding to the seat of the foreign body; both of the circumscribed defects in *F* are surrounded by a zone of imperfect perception (shaded lightly in the figure), the borders of which extend to the point of fixation, and thus explain the moderate but well marked diminution of central vision.

In the course of further observation, the traumatic inflammation of the retina diminished, the capsule became thinner, and nourished by a fine branch from a retinal vessel. January 4, 1880, the following picture was projected (Fig. 2, Plate V, shows it *inverted*, for comparison with *F*. The *description* refers to the erect image.): The bolt-like foreign body lies almost naked near the optic nerve, and is covered only by a gauzy, white layer of connective tissue.

* A similar one will be found, if sought for, in Mr. Snell's case, as in our case reported in the *Berl. Klin. Wochensch.*, 1875, pag. 22. The enlargement of the blind-spot is an interesting form of the functional disturbance. In a case of extremely marked "choked disc," due to a kidney affection (with echinococci of the abdomen), the finest type was read; *F.* normal; but the blind-spot in the right eye was enlarged from 2° to 22° both horizontally and vertically, and was also surrounded by a narrow zone of indistinct perception. The blind-spot in the left eye was also enlarged, but only from 8° to 22°.

The edge of the anterior surface is black, and broadest toward the nasal side, where a few white, glistening spots appear isolated amidst the black contour. The lower and medial surfaces of the foreign body are seen in perspective foreshortening, like a whitish semilunar cape, which is set off against the black contour, and surrounded by a delicate brown border of pigment where the point lies embedded in the retina. A delicate membrane, resembling connective tissue, curves from the upper edge of the black contour to the background of the eye, and there conceals the vena nasalis superior. The inner and upper portion of the edge of the optic nerve is still somewhat indistinct.

We must here expressly remark that an observation extending over a few months only is too short a time in which to decide upon the ultimate fate of such a case; even after years, the foreign body may fall from its capsule and cause detachment of the retina. At the time, however, we did not feel justified in attempting to remove a foreign body lying so perilously close to the optic nerve.

CASE 2.—*Fragment of gun-cap successfully removed from the anterior chamber nine years after it had entered.*

December, 27, 1879.—A student, æt. 18, came for advice regarding a recurring inflammation of his right eye, which he attributed to a cold, and had lasted for three months. The first attack was in May, the second in September, the third in December. The left eye was normal. The right eye showed pericorneal injection; iris greenish and spongy, pupil hardly of medium width in spite of instillations of atropia, with numerous synechiæ, and its lower half obstructed by a connective tissue membrane. A reddish, sharply-circumscribed and projecting nodule—like a gumma—lay on the iris downward and inward between the lower edge of the pupil and the ciliary margin. Fingers counted at 3′, eccentrically. There was no reason to suspect syphilis. The ophthalmoscope showed posterior cortical opacities. A small linear scar could be seen by focal illumination in the horizontal meridian of the cornea in front of the nasal edge of the pupil. It was now evident that a foreign body must be present in the eye, although it could not be discovered in the nodule. Careful questioning revealed the fact that the patient, nine years ago, was standing behind his brother

when he exploded a gun-cap, and that the patient suddenly saw a black body floating in front of him in the air. Although no inflammation followed, the right eye could no longer read.

December 30th.—The operation was performed without narcosis according to Knapp's method, and the section made (although in other proportions) just as for Davel's flap extraction. A narrow incision was made with the lance knife at the temporal side of the nodule on the iris, at the lower margin of the cornea: very fine Luer's scissors were then introduced, and the incision enlarged nasally to 3″. Thus, without any lesion of the nodule, we had a sufficiently large incision at the margin of the cornea, such as could not easily have been obtained by a simple incision with the lance, or even with the narrow knife. The nodule and adherent iris were then easily withdrawn from the eye with curved iris forceps, and abscised outside the eye with the scissors; but no foreign body was found in the nodule; on the contrary, a glittering yellowish splinter was seen resting on the anterior capsule. As the section was large enough, this splinter was easily removed by the help of a blunt hook. The healing process went on uninterruptedly, but vision did not improve very much, owing to the posterior cortical opacities, which may at a later date render a cataract operation necessary. The artificial coloboma had narrowed a great deal when the patient was dismissed. The nodule consisted of small-celled granulation tissue (granuloma simplex traumaticum). A few ramifying pigment cells were found in the posterior layer.

CASE 3.—*Piece of gun-cap remaining thirteen years in the fundus of the eye.*

Mr. P., æt. 20, presented himself November 25, 1879. In 1866 his right eye had been wounded by the explosion of a gun-cap. According to the patient's statement, the foreign body had been extracted a few days later, and in 1877 an iritomy made. The left eye had always been myopic, and for a year and a half had been affected so obstinately with photopsies that the patient could hardly carry on his business.

The left eye shows M, 4 D; S normal; small posterior staphyloma. The right eye is free from irritation, but is blind. It squints considerably outward, and shows a broad, horizontal artificial pupil, with a corresponding opening in the capsule of the lens: the lens is absent. The ophthalmoscope shows an exten-

sive and prominent detachment of the retina inward and downward, and just above and in front of the most prominent fold a bluish, glittering, fixed mass, which is assumed to be the encapsulated foreign body.

Optico-ciliary neurotomy had already been proposed to the patient elsewhere. In case of foreign bodies in the interior of the eye which have already produced or threaten to produce sympathetic symptoms in the other, I decidedly prefer enucleation, and so performed it on the same day. Cure followed in the usual manner.

The globe was placed in Müller's solution after the best planes for sections (diagonally from down and inward, to outward and upward) had been marked by two silk threads. Dec. 21, 1879. The globe was opened in the planes mentioned. Some fluid at once escaped from behind as well as in front of the retina. The vitreous was completely liquefied, and after its escape the bulb consisted merely of the investing membranes of the eye, without a trace of the refracting media (lens, vitreous).

The detachment of the retina is funnel-shaped. In the larger lateral half of the specimen, we see the sharply defined and gaping section in the delicate lenticular capsule which. toward the upper part of the ciliary body only, shows a slight, whitish thickening. A membrane, like a spider's web, with a few white dots, lies just behind the capsule in the anterior portion of the vitreous. A moderately large splinter of iron is embedded in the medial half of the globe about 12 *mm.* from the optic nerve, and has fastened the retina, choroid and sclera firmly together (Plate v, Fig. 3, B F). The fragment of iron is smooth, quite covered with a thin white layer, and is black at one corner only. The choroid is united to the sclera over a very small extent, and at the equator the two can be easily separated.

There is no microscopic alteration in the ciliary body. The lower pars ciliaris retinæ is wholly detached. No microscopic examination was made.

CASE 4.—*Shot in the eye.*

Oct. 4, 1878, F. N., æt. 19, reported that he had received a discharge from a shot-gun in the right eye while beating up game. The opening of the perforation is visible in the sclera below the cornea ; considerable chemosis, the lids swollen, and the anterior chamber full of blood. Oct. 10th, a shred (uvea) hanging from the perforation is removed, and warm fomentations applied. Oct. 11th, the chemosis less, cornea clear, pupil filled with blood. Oct. 12th, the chemosis has disappeared, the bulbar conjunctiva is congested, and the region of the wound prominent.

Oct. 17th, the purulent choroiditis has disappeared rapidly under the application of the warm fomentations, but as the foreign body is still in the eye, and cyclitic pain persistent, the danger of sympathetic inflammation of the second eye seems rather increased by this procedure. Pericorneal injection is more marked, but the cornea clear. The opening of the perforation bulges forward as large as a split pea, and gelatinous yellowish-green vitreous protrudes. The pupil dilates moderately after atropia ; there is a large coloboma downward and inward ; lens greenish ; vitreous permeated with pus and blood.

Enucleation : cure as usual, and the other eye continued sound.

The bulb was opened in the horizontal meridian. The retina was completely detached and broken up into shreds (Plate v, Fig. 4 *A*, and 4 *B*, *aa*). A large clot seems to surround the detachment (*bb*) ; the lateral half of the lens (*cc*) is very much crushed. The lateral half of the ciliary body is excessively thickened and the adjacent portions of choroid separated from the sclera as far as the equator. The medial half of the bulb contains a cyst between the retina and choroid, in which lies a flattened hemispherical shot (*d*) which must have penetrated the cornea obliquely from right to left, rebounded on the sclera, and then fallen into the left lower half of the bulb where it rests. A section through the point of entrance shows that the sclera must have been opened over a space of several *mm.*, since the infiltration of the vitreous extends to the outer surface of the bulb.

The case is also of medico-legal interest. At the end of

1879, I was asked to testify judicially whether this was a direct or rebounding shot. From the flattening and slight force of the shot, it seemed to me that it was a rebounding shot.

CASE 5.—*Circumscribed abscess in the vitreous from a penetrating splinter of iron.*

December 15, 1879. H. K., æt. 31, consulted me for treatment of a fragment of chisel which had struck his left eye five weeks before, while cutting a piece of steel. At the time of the accident he closed his eye on account of the excessive pain, but noticed, while it was still open, a dark body in the field of vision. But he could still see. The dark body grew larger on the following day: violent pain ensued at night; he applied to the ophthalmic surgeon of his medical aid society in the morning, and remained under his care until December 12th, while S decreased and F contracted inward from the right and above. December 14th he came under my charge. At the first glance it was evident that a foreign body lay in the globe. A white and sharply defined scar made up of two linear scars at right angles to each other and 1½ *mm.* long, is visible at the extreme upper edge of the transparent cornea. Directly behind it lay a contracted scar of the iris. The anterior portion of the lens, directly behind the capsule, showed a small, circumscribed, yellow opacity, as well as a distinct suffusion of the posterior layers, which adjoins a purulent infiltration of the vitreous. The lower portion of the vitreous is much more noticeably infiltrated and slightly reddish. Pericorneal injection is also present, and the ciliary region is so sensitive that the patient shrinks from having it touched. There could not be the least doubt of the presence of a foreign body in the interior of the eye. It probably lay in the lower part of the vitreous. Five weeks had ensued since the accident, and the danger of sympathetic irritation was therefore imminent. I, of course, proposed an immediate enucleation, and performed the operation at once, after having convinced the patient of its superiority over the optico-ciliary neurotomy which he desired.

December 21st.—The bulb was opened in the horizontal meridian. The upper half showed, first of all, that the supposed infiltration of the vitreous was simply a partially purulent infiltration of the posterior lamellæ of the lens. (Fig.

5, B, *a*, Plate V.) The lower half of the bulb (Fig. 5, A) is exceedingly interesting. The vitreous is detached from the retina in the shape of a funnel, and its apex attached precisely to the slightly swollen papilla. A flat and folded detachment of the retina extends from the papilla downward and forward into an abscess as large as a pea in the centre of the vitreous which is otherwise transparent and only slightly condensed. This abscess is directly continuous with the purulent infiltration of the posterior lamellæ of the lens, and evidently conceals the foreign body. In order to remove the foreign body without destroying the interesting specimen, the vitreous was opened, as far as the abscess, with two anatomical needles, and a metallic splinter easily removed from the abscess by our electro-magnet. The splinter was 2 *mm.* long, 1 *mm.* broad. The ciliary body was very thick and detached as far as the equator; the iris was also infiltrated.

CASE 6.—*Fragment of stone in the eye; fresh cyclitis.*

F. K., æt. 26, was seen April 3, 1879, a fortnight after having wounded his left eye while blasting rocks.

Left eye S=0; marked pericorneal injection; small scar with prolapse of iris at the lower inner margin of the cornea; iris green; capsular cataract; greenish reflex from behind the lens, indicating infiltration of the vitreous.

As the presence of a foreign body (fragment of stone) in the interior of the eye was so evident, the globe was removed on the following day, and the patient discharged a week later.

The bulb was opened April 12th, on a plane from inward and downward, to outward and upward, corresponding to the meridian of the cornea in which the prolapse of iris was. The changes in one half of the preparation were less marked, although striking enough.

The lower half of the iris was adherent to the cornea; the ciliary body more thickened below than above; the lower edge of the lens was permeated by a mass which passed into a flake of pus at its posterior surface; the vitreous, detached by shrinkage from the retina behind, was infiltrated with pus

in the fossa lenticularis for a depth of about 1.5 to 2 *mm.*; and besides this, thick purulent yellow septa, diminishing as they ran backward, radiated from the lower margin of the lens and the ciliary body toward the posterior limit of the vitreous.

In the other half of the specimen (Fig 6, Plate V), the prolapse of iris was exactly divided by the plane of the section. The iris bent forward and outward close to the ciliary body, and lay in the corneal wound as far as its ciliary margin The ciliary body was slightly detached from the sclera, excessively thickened, and at its inner surface most intimately united with a yellow, coarse layer of transformed vitreous at least 5 *mm.* thick. The larger portion of the vitreous was occupied by a coarse, triangular abscess, whose posterior apex closely adhered to the papilla, while laterally it was detached from the retina. The foreign body, a piece of granite 2 *mm.* long, 1½ *mm.* each broad and thick, lay firmly embedded in the membranes of the eye, in the deposit on the ciliary body, and a little sideways from the plane of the section.

CASE 7.—*Fragment of iron in the interior of the eye; double neurotomy; enucleation.*

July 2, 1878.—A workman, æt. 28, came to the dispensary immediately after a piece of metal had struck his right eye while he was cutting iron. S =O. Both cornea and iris were penetrated; wound closed; cataract. I bandaged the eye, and sent the patient with a diagnosis of a foreign body in the interior of the eye to the hospital, required by the mutual medical aid society to which he belonged.

July 18*th.*—According to his account, the nerve was killed, and the operation repeated August 17, 1878, for recurrence of pain.

July 23, 1879.—The patient came to me again, complaining of intense pain.

The right globe was very much shrivelled, sunken, and *excessively sensitive to pressure.* The cornea, on both sides of which the two large conjunctival scars of the double optico-ciliary neurotomy were distinctly visible, was less sensitive. The upper two-thirds of the

cornea were transparent, the lower third cicatricial and adherent to the iris; the point of a fragment of iron projected from the cicatricial tissue. It did not yield to the forceps, but after enlarging the corneal cicatrix with a small knife, it could be extracted by using moderate force. It was 17 *mm.* long, 2 *mm.* broad, and awl-shaped.

Left eye: Ophthalmoscopic picture normal, but S only $\frac{15}{200}$. Sn. 2½ at 5″. The patient assured us that the sight of this eye was much better before the accident.

July 25th.—The patient was received into the hospital. Pericorneal injection still persisted, as well as the peculiarly acute pain on touching the ciliary region of the globe. The cornea and conjunctiva were still sensitive. For this reason enucleation was proposed, accepted by the patient, who thought more of ability to work than the preservation of a blind stump, and at once performed. Thick cicatrices had formed behind the stump; the end of the optic nerve could not be discovered; cure as usual.

August 4th.—On discharge, left eye read Sn. 1½ at 7″; with — 2.5 D, S $\frac{15}{20}$.

When the enucleated eye was opened, December 22, 1879, the uveal tract and retina were detached from the thickened and folded sclera, and the space was filled with firm connective tissue. The ciliary nerves were carefully dissected out on the inner surface of the sclera, and found histologically normal, as was to be expected from the result of the physiological examination.

This case is very instructive. At the time when the antisympathetic section of the optic nerve was revived, I did not hesitate to express my doubts of its success; because, according to all surgical experience, sensitive nerve fibres reunite after being divided. As a matter of course, I entered into the subject myself, and first performed the operation in simple cases, such as atrophy of the globe without painful cyclitis, where we usually leave well enough alone or insert an artificial eye. I then advanced to more serious cases of traumatic and probably idiopathic cyclitis with amaurosis. I always thoroughly denuded the posterior half of the globe * after grasping the stump of the optic

* Compare *These Archives.* Vol. viii, page 143.

nerve with the forceps and bringing it into the middle of the palpebral aperture, in doing which, of course, the tendons of both obliques were divided; I then replaced the half-enucleated globe and stitched together the muscles which had first been divided (external or internal rectus).

Up to this time I have had no disagreeable accidents (excessive hemorrhage, protrusion, destruction of a still transparent cornea) in my nine operations. But without exception, after one year's observation of the cases which I had opportunity of watching, I could always prove that the sensibility of the operated globe, particularly of the cornea, had returned, whenever sensibility had been present before the operation. This cannot be ascribed to my method of operating, which is rather more extensive than that of many oculists. The case in question (in which the operation was not done by myself but by a renowned and experienced oculist) of even a double, medial as well as lateral, neurotomy, strengthens me in my opinion. Dor (*Centralbl.*, 1879. Page 129) has drawn attention to the two or three direct ciliary nerves which, according to Cruveilhier,* penetrate the anterior portion of the sclera beneath the recti muscles, one of which, at least, may remain unsevered by the usual optico-ciliary neurotomy. Dor concludes from this anatomical fact that, "although the operation can be of benefit in a few cases, we must vigorously oppose the new tendency to dispense with enucleation in all cases (except tumors), for we should then give our patients but delusive security."

Referring again to the present case, I would emphasize the fact that even the division of *all* the ciliary nerves, as is done in double neurotomy, does not always guarantee protection.

A cyclitis, even if traumatic, *can* heal of itself; if we have divided the chief nerve-tracts before the dangerous period of sympathetic transmission, the patient *can* be permanently cured or seem to be, even when, at a later period, the sensitive nerve-tracts in the diseased or wounded globe are

* Compare Henle *Anat.* 2te Aufl., 1879. Band iii, 2, page 401, *et seq.*, fig. 246.

restored. (It is well known that many patients recover from severe cyclitis of one eye, without any surgical interference, and without any disturbance on the part of the second eye.) But if a permanent irritative cause, such as a large foreign body remains in the globe in which neurotomy has been done, at some time or other a new period of danger will ensue.

No experienced ophthalmologist will deny that such a period had begun for our patient; no prudent one will wait until the danger has really broken out.

I believe that we shall soon abandon our over-estimation* of the value of optico-ciliary neurotomy. The harmless enucleation of totally blind and painful stumps has still other advantages. Dr. Landsberg called attention to undiagnosticated tumors at a debate in the Berlin Medical Society, and I can offer an interesting contribution to this topic. One of my assistants gave me a specimen from a patient who died with the symptoms of an organic defect of the heart. At the autopsy, melanotic nodes were found in the heart, and it was difficult to discover the origin of these metastatic growths, until it was remembered that one eye became blind twenty years before, after gonorrhœal suppuration of the conjunctiva: this was at once enucleated. The small shrivelled globe was filled with a dark-gray mass, and showed grayish-black *episcleral* nodes. Past and present, many cases have been described as ocular tumors, which were really nothing of the sort. The most accurate description of the microscopic condition often gives us no assurance, so long as the naked eye fails to define a distinctly visible node. I myself should be skeptical, if only the contents of the shrivelled bulb were melanotic. But in this case the distinctly visible episcleral node left no room for doubt. Its structure was that of a small-celled sarcoma, sprinkled with larger spindle-shaped pigment cells in lines or patches.

* Schweigger (*Handbuch*, 4te Aufl., 1880), *e. g.*, says: "The indication for enucleation will hereafter be confined to intra-ocular tumors, and eventually to eyes in which foreign bodies keep up a chronic inflammation."

Explanation of the figures (*Plate V*).

Fig. 3.—*A* and *B*; fragment of gun-cap in fundus of right eye. *A*, upper; *B*, lower half of bulb; *F*, the fragment of gun-cap which has fastened the retina, choroid and sclera together.

Fig. 4.—*A* and *B*; shot in the left eye. *A*, lower; *B*, upper half of bulb; *aa*, broken down retina; *bb*, coagulum of blood partly mingled with vitreous; *cc*, shattered lens; *d*, spot in the cyst in which the shot lies* embedded.

Fig. 5.—*A* and *B*; abscess of vitreous from penetrating fragment of iron, left eye. *A*, lower; *B*, upper half of bulb; *aa*, posterior lamella of lens infiltrated with pus; *bb*, detached vitreous; *c*, abscess at the bottom of the vitreous (shining through); *d*, fold of retina.

Fig. 6.—Fragment of stone in the left eye: *a*, iris in the corneal wound; *b*, partly detached vitreous; *c*, yellow deposit, 5 *mm.* thick, on the ciliary body, in which the fragment of granite lay.

* This was not opened in the horizontal section but lies deeper.

ON THE DETECTION OF MERCURY IN THE URINE, AFTER CALOMEL HAS BEEN DUSTED INTO THE CONJUNCTIVAL SAC.

By ALBERT ALSBERG, M.D., of Heidelberg.

Translated by Isidor Furst, of New York.

THE favorable results attained by the dusting of calomel into the conjunctival sac for phlyctænular affections of the eye, for all varieties of pannus, and for parenchymatous keratitis, admit of a twofold explanation. The calomel acts either purely mechanically on the conjunctiva and the cornea, or else it is absorbed in some form and produces a chemical effect. The latter may be considered as proven if we succeed in demonstrating the presence of mercury in some excretion of the body, after calomel has been dusted into the conjunctival sac.

Much as the question has been ventilated, I find in the literature to date only one report of investigations into this matter. Kämmerer (Virchow's *Archiv*, Bd. 59, p. 459) examined both his own urine and that of two patients of Engelhard's ophthalmological institute at Nuremberg. In every case he took the urine of eight days during which calomel had been dusted in. In all of the three cases he succeeded in detecting mercury in the urine.

In order to ascertain more definitely the manner of absorption, the amount of calomel which must have been dusted in, the lapse of time after which the mercury is demonstrable, etc., it seemed desirable to repeat the investigations. During the summer of 1879, I have, therefore, tested for mercury the urine of a number of children admitted

to the Heidelberg ophthalmic clinic with phlyctænular inflammations of the eyes, and who were treated with insufflations of calomel. Although the circumstances unfortunately did not permit me to terminate the work, it would seem justifiable, on account of the sparsity of hitherto recorded investigations, to publish the positive results regarding the detection of mercury in the urine after calomel insufflations into the conjunctival sac.

I employed the process detailed by Fürbringer (*Berliner kl. Wochenschrift*, 1878, No. 23). This process has in common with other methods for the detection of the minutest quantities of mercury the principle of the production of an amalgam of mercury by the introduction of foils of metal into the fluid to be examined; the heating of the amalgam in a glass tube until the mercury sublimates and is precipitated on the wall of the tube in minute globules; and, by the admission of iodine vapors, the transformation of the mercury into a mercuric iodide, which may be recognized as such by its characteristic red color. For the production of the amalgam Fürbringer employs the so-called brass-wool—a shredded foil used in the ornamentation of Christmas trees.

For every analysis I took from two to five litres of urine —a quantity about corresponding to that voided in as many days by children of from five to twelve years. The urine to be tested was rendered acid and heated to 60–80° C. Then ¼ to ½ grm. of brass-wool was added, and left in the fluid for ten minutes with constant stirring. The brass-wool, after removal, was washed in alcohol and ether, dried, compressed into a pellet, and pushed into the distillation-tube measuring 0.6 to 0.8 *cm.* in diameter, one end of which was drawn out into a capillary tube 0.1 *cm.* wide. The other extremity of the tube was then likewise drawn to a capillary size, and the wool carefully brought to a red heat. During this operation a black sublimate is deposited on both sides upon the walls of the capillaries, a part of which, if iodine is evaporated within the tube, assumes in the presence of mercury the characteristic red color of mercuric iodide, generally in form of a ring.

Among the fifteen testings which I made altogether, I obtained the reaction for mercury twice distinctly. In the one case I employed 3.5 litres of the urine of a girl of nine years, and obtained very handsome red rings on both sides. In the other case I took 2.5 litres of the urine of a boy of ten. In one of the capillaries the reaction for mercury was distinct.

A number of negative results will have to be ascribed to insufficient investigations. The execution of the analysis requires some technical dexterity which I had to acquire.

Postscript.

In a letter accompanying the preceding article, Dr. Alsberg expressed the apprehension that his positive results would not be quite convincing, because the simultaneous employment of an ointment of mercuric oxide could not be positively excluded in those children. This induced me to request our hospital apothecary, Dr. Vulpius, to test the urine of an adult, who had been treated for some time with calomel insufflations, and with whom no such doubt existed, for the presence of mercury.

The result is contained in a communication dated May 5th, which I, of course, append.

OTTO BECKER.

"On April 15th, the urine of M. H., from Erfurt, æt. 19, was delivered to me. She had been treated at the clinic of our university since February 9th for parenchymatous keratitis of the left eye, and had daily had about one milligramme of calomel dusted into the affected eye.

"It was to be attempted to detect mercury in the urine. The method employed for that purpose was the one recommended by Fürbringer in No. 23 of the *Berliner Klin. Wochenschr.* of 1878, which, as you are aware, consists in leaving the slightly acidulated and heated urine for some time in contact with so-called *lametta*—very thin strips of copper coated with a kind of brass—which is dried by quick successive washings with water, spirits of wine, and ether, in order to heat it finally in a properly drawn-out glass tube. The slightest traces of mercury sublimated in this way

become visible by iodine vapors cautiously developed within the tube, through the formation of a scarlet-colored biniodide of mercury. As but very small quantities of mercury could be expected in the urine in question, I reintroduced the same lametta into the urine furnished on the 15th and on the 16th of April, but without any positive result.

"I then repeated the test from the 17th to the 21st of April inclusive—hence with the urine of five days—but was disappointed as before.

"Then the urine of ten days, from April 22d to May 1st inclusive, was examined, and the lametta each time left in contact with the urine for fully twenty-four hours, *i. e.*, always until the arrival of the next daily quantity. Finally, I had the satisfaction, by the above-described further treatment of this quantity with lametta, of obtaining a certainly very faint, but distinctly visible red coloration of mercuric iodide, which excluded any doubt.

"This result demonstrates the sensitiveness of the method employed, for we may safely assume that of the 1 cgrm. of calomel which had been dusted in during the space of ten days, at most one-half was present in the urine, and that the mercury of this one-half was only partly deposited upon the lametta, so that, perhaps, the quantity of mercury really obtained may have amounted to less than one-half milligramme."

IRIDO-CHOROIDITIS GUMMOSA, AND THE FREQUENCY OF SYPHILITIC IRITIS IN GENERAL.

By Dr. SEGGEL, Surgeon, German Army, Munich.

Translated by Isidor Furst, New York.

FÖRSTER, in Gräfe-Sämisch's *Handbuch der ges. Aug.-Heilkunde*, says of gummous nodes in other parts of the eye than the iris, that those situated in the ciliary body and sclerotic are of extraordinarily rare occurrence, and that they, as well as gummous iritis generally, occur in a later stage of syphilis.

In the literature, as far as it is accessible to me, I do not find any new cases excepting those recorded by Förster (l. c.); therefore the publication of the following isolated case may be justified, the more as it is of interest with respect to the differential diagnosis. In the first place, however, I should like to take a brief review of the literature bearing on the subject, pointing out some deviations as I add my own observation.

Colberg, in v. Gräfe's *Archiv*, Bd. viii, Abth. 1, p. 292, has, first, by the microscopic examination of a specimen furnished him by Alfred Gräfe, demonstrated that the proliferations in the iris tissue which are commonly called condylomata are really gummata.

Prof. Schmidt-Rimpler, in *Berl. Klin. Wochenschrift*, 1872, No. 23, "Beiträge zur Kenntniss der Iritis syphilitica," expresses himself thus:

"Iritis occurs in the great majority of cases at the time of the secondary period (Ricord), mostly in conjunction

with affections of the skin and mucous membranes. Iritis condylomatosa, or rather gummosa, however, is generally considered as belonging to one of the later periods of syphilis. In very rare cases, these gummous new-formations extend to the ciliary body and choroid, and may perforate the sclerotic." In the majority of the cases cited by Schmidt-Rimpler from the literature of this subject—by Desmarres (Traité des Maladies des Yeux, 1855, vol. ii, p. 501), Arlt (die Krankheiten des Auges, Pt. ii, pp. 67 and 88, 89), Mackenzie (Traité pratique des Maladies des Yeux, traduit de l'Anglais par Langier et Richelot, Paris, 1844, p. 376), and v. Hippel (v. Gräfe's *Archiv*, Bd. xiii, Abth. 1, p. 65)—as well as in the two cases observed by himself, there existed a coincidence of gummous tumor of the ciliary body with iritis gummosa.

In the first of these two cases the light grayish-blue colored prominence under the conjunctiva was 1½ lines (= 3 *mm.*) distant from the upper corneal margin; in the second, only one line, so that both still belonged into the region of the ciliary body. In v. Hippel's case, the two small roundish eminences were in the sclerotic, about one line from the lower corneal border.

In all of the cases cited by Schmidt-Rimpler from literature, which he more fully described, the gummous proliferations in the ciliary body perforated the sclerotic which cicatrized after their disappearance, or else they burst during enucleation, as in v. Hippel's case. The occurrence of gummous tumors in the choroid back of the ciliary body may be deduced only from the note of Mackenzie's communication (l. c.), who mentions that such a tumor led to thinning of the sclerotic and "choroidal hernia," or perhaps from the remark of Coccius: "The sclerotic in syphilis may be found partially altered by small white nodules in its episcleral covering tissue, or even by larger livid prominences (among the rarest clinical objects) in its stroma proper." Of course, C. here refers to a scleral location of the proliferation.

Only in v. Hippel's case is choroiditis gummosa anatomically demonstrated, of course in conjunction with scleritis, iritis, and retinitis.

In a case described by Estländer (*Klin. Monatsblätter f. Aug.*, 1870, p. 259), in which, however, no circumscribed vegetations or condylomata could be observed, iritis did not occur until a few months later, when only a deep, grayish cicatrix remained of the tumor situated at the outer border of the cornea, in front of the tendon of the external rectus muscle. This tumor was in the cellular tissue beneath the conjunctiva, was level and flat, *i. e.*, with smooth and not uneven surfaces; it measured in its horizontal diameter nearly 5 *mm.*, vertically 3 *mm.*, and about 2 *mm.* in height. The patient on admission was 19 years old, and bore the signs of syphilitic, ulcerating cutaneous tubercles. Potassium iodide and Dec. Zittmanni having been without effect, the gumma healed after a course of repeated inunctions, so did the cutaneous ulcerations, and lastly the iritis. Estländer—by-the-by—locates the starting-point of the swelling under the conjunctiva, and expressly excludes any participation of the inner parts of the eye.

In the first case of Barbar's (Inaug. Diss. "Ueber einige seltene syphilitische Erkrankungen des Auges," Zurich, 1873), in a man of 26, a yellowish-red tumor, nearly as large as a cherry-pit, developed 2 *mm.* from the external upper border of the cornea, beneath the conjunctiva, fifteen months after the first appearance of a syphilitic exanthem with contemporaneous phlyctænular ulcerations of the conjunctiva and purulent infiltration of the cornea, and six months after a non-gummous iritis which had at first received the ordinary treatment and was finally cured by iridectomy. The tumor was resistant, clearly defined, ascending steeply from the sclerotic with which it was intimately connected; while the conjunctiva could easily be displaced both at the margins and on the apex. Conjunctiva and sclerotic were injected only in the neighborhood of the swelling; the contiguous part of the cornea was slightly, diffusely opacified. The tumor was not spontaneously painful, but pressure upon it caused a dull pain. The existence of a gumma scleræ was not doubted, but in the résumé the ciliary body is substituted for the sclerotic as the starting-point of the tumor. Under the treatment instituted, potassium iodide internally

and atropine instillations, the tumor grew gradually flatter, and without change in the tension of the globe a thinned depression with bluish translucency eventually took its place. A fresh iritis with hypopyon, occurring two months later, endangered the eye to the utmost.

Barbar's second case happened in a debilitated woman of 33, in whom could be demonstrated later a peculiar exanthem resembling variola, but undoubtedly syphilitic; angina with lardaceous coating of the pharynx, and considerable infiltration of the inguinal glands. Patient presented herself about the end of March with iritis conjoined with a fibrino-purulent exudation in the pupillary region. On April 8th, a very prominent inflamed spot on the sclerotic was discovered, 2 *mm.* above and outward of the cornea. It was resistant, quite spherical, and sharply defined. Considerable injection in the conjunctiva. Under mercurial treatment, the purulent exudation in the papillary region was uncommonly rapidly resorbed, the scleral tumor flattened, and gave place to a very distinct gray-black cicatrix.

Barbar's third case happened in a man of 26: gumma extraordinarily large, springing from the external half of the iris and the ciliary body, and commencing to perforate the sclerotic. Termination in phthisis bulbi, under the local application of cataplasms, and potassium iodide internally. The eye affection had occurred together with a very severe exanthem and the formation of large abscesses in the scalp.

In the fourth case of Barbar's, likewise a man of 26, who had first presented himself on July 21, 1877, with specific iritis of the left eye, a spherical projection of the sclerotic was observed ten days subsequently, 2 *mm.* outward from the lower inner border of the cornea, corresponding to a previously discovered yellowish swelling of the iris near the sinus of the anterior chamber. The tumor increased in size and its blackish discoloration grew deeper until September 11th, when a gradual shrinking commenced, and the entire eye grew phthisical. The section of the enucleated globe showed in the main a perforation of the sclerotic and detachment of the ciliary body at the place of the previously existing gumma.

I shall now proceed to the description of my own case

Private Caspar Baumann, Co. 11, Second Reg., Bavarian Inf., æt. 22, was received Feb. 11, 1880, to the syphilitic ward of the Munich Hospital Barracks. Patient stated that four weeks ago he had accidentally scalded his genital organs with hot water, and indeed showed serous spots, as apparent scalds, upon the prepuce, the skin of the penis and scrotum. It was noted, however, that the inguinal glands were greatly swollen. A more careful examination showed, besides, multiple indolent indurations of the cervical and occipital glands, broad condylomata at the anus, and, with congenital complete phimosis, at the junction of the external and internal surfaces of the prepuce, bleeding excoriations. On February 17th, a course of inunctions was commenced, altogether 24 doses of 3 grms. each of blue ointment having been rubbed in. On the last day of this treatment, March 14th, the excoriations, serous spots on penis and scrotum, and the condylomata ani had healed, and appeared then as red spots. But patient complained to-day, without having been exposed to any external injury, for the first time of pains in the right eye, the conjunctiva of which was injected, but the iris not discolored. After ice applications the pain in the eye disappeared and the conjunctival injection decreased, but persisted. Patient now received Ricord's pills.

On March 21st, patient again complained somewhat about tenderness in the right eye and temporal region; the pain increased with continued ice applications; on the following day a vesicular elevation occurred at some distance from the external corneal margin, apparently springing from the conjunctiva bulbi, and supposing it to be a phlyctænular affection, calomel was dusted in on March 23d.

On March 25th, considerable photophobia occurred for the first time, and as the pain and injection again greatly increased until the 30th, the diagnosis of specific iritis was made, atropine was instilled, and mercurial and belladonna ointments were rubbed into forehead and temple. In the left eye, too, pain and photophobia set in on March 29th, but the conjunctival injection was here quite inconsiderable.

On April 1st, according to the record, there appeared in the right eye great injection of the conjunctiva and irregular distortion of the pupil; on April 3d, for the first time, a small projec-

tion of the sclerotic at the external margin of the cornea, also the occurrence of very violent headache in the evening, and on April 4th, with intense photophobia, great tenderness of the globe to the touch. Patient therefore, on April 5th, applied two leeches to the temple, and the tenderness diminished.

On April 7th, patient was transferred to the ophthalmic ward, and now positively admitted infection in the beginning of December of last year, having observed an abscess on the penis eight days after coition, which, however, had healed by simple regard to cleanliness; he further reported that he had otherwise been quite healthy; that, when eight years old, he had had a violent inflammation of both eyes, during which, he says, he did not see anything for sixteen weeks. In the anterior third of the penis, above toward the right, a white stellate, but not indurated cutaneous cicatrix, about 8 *mm.* long and 5 *mm.* broad, marks the position of the former abscess; induration of glands, as above stated; no exanthem; no faucial affection.

The right eye shows great injection of the palpebral and bulbar conjunctiva; iris decolored and swelled; pupil narrowed, ragged and immovable in consequence of numerous posterior synechiæ, preponderating at the medial border, but free from gummous excrescences. Fundus visible as through a dense veil; no membranous exudation in the pupil; no diffuse opacities in the vitreous observable, either now or subsequently. Snellen X read with difficulty; the right globe is decidedly softer on the touch than the left, very sensitive on pressure in the ciliary region, particularly when the above-mentioned projection near the external corneal margin is touched with the lid.

Patient then throws his head back in the manner so characteristic of cyclitis.

The scleral projection now presents the following appearance: 4 *mm.* from the lateral corneal border, a short distance above the horizontal meridian, the sclerotic projects nearly hemispherically, with a base of three and an elevation of rather more than two millimetres, so that under the movable conjunctiva, though the vascular injection was here most pronounced, the sclerotic is translucent with a light-bluish coloration. Despite the great tenderness, it may be demonstrated that the crest of the prominence is not compressible, and that its resistance is somewhat increased.

The first prescription consisted in recommencing the inunc-

tions ; but, inasmuch as they had been previously carried out so thoroughly, and as the first symptoms of irritation in the eye coincided with their discontinuance, in a modified form (0.5 grm. *pro die*), and in conjunction with a methodical course of sudorifics and the exhibition of Dec. specier. lign. Atropine (1:100) was energetically instilled into the eye ; first hourly, later, every two hours, and cataplasms applied, in order to effect the solution of the synechiæ which had not yielded before. The apprehension, entertained at first sight, of pupillary occlusion by a circular synechia, proved erroneous after very thorough examination with focal illumination, and it could be demonstrated that the upper external margin of the pupil—corresponding to the direction of the protuberance—was free, and that the generally slight depth of the anterior chamber, especially at the periphery, was not caused by projection, but by the great swelling of its parenchyma. The thought of an eventual iridectomy, therefore, could at once be abandoned.

On the following day, April 8th, the pain had considerably moderated and the injection seemed to be less.

On April 9th, the pupil was somewhat wider ; some synechiæ drawn out into threads ; the anterior chamber deeper, owing to the lessened swelling of the iris ; the inflammation in general visibly diminished ; the pain almost gone.

On April 10th, the third day of treatment, a marked decrease of the scleral protuberance could be clearly demonstrated ; no more pain was felt on pressure, but great photophobia persisted, and the general pericorneal injection was, at any rate, still considerable.

From this time on, without disturbance, day after day a diminution of the inflammatory symptoms occurred, and the protuberance in the sclerotic, always presenting a spherical outline, grew steadily smaller, so that by April 26th, it had nearly receded to the normal level, and by the 28th, it was recognizable solely by the very slightly bluish tinge and by some thicker vessels extending in horizontal and vertical directions through the conjunctiva above it. These vessels, the only external remnant of the injection of the globe, were exactly like those persisting after phlyctænular affections, and continued until May 20th. The dilatation of the pupil on April 17th was complete, excepting a wartlike projection inward, from which extended three parallel threads, like the strings of a violin. Their absorption was not effected,

and the pupil, therefore, retained a kidney shape. Opacity of the cornea did not exist at any time, only some corrugation and protrusion of the external upper part of the annulus conjunctivæ (one-sixth of the periphery). The portion still showed a sickle-shaped thickening with a clear border extending across the cornea when the patient was discharged.

The visual power, which on April 20th was only $=\frac{20}{100}$, had improved to $\frac{1}{2}$ by April 22d. The field of vision was of nearly normal extent, only above-inward and below-inward was a limitation of 5°, respectively 6°. The tension of the globe, at first somewhat diminished, had soon become normal; but on testing the resistance of the spot where the protuberance had formerly been, with the button of the probe, it was found decidedly diminished—a circumstance which, in connection with the translucent, finally faintly grayish-blue coloration, pointed to a thinning of the sclerotic.

In regard to the treatment, it should be stated that 20 inunctions were made, using altogether 10 grms. of unguent. hydrarg., and the sudorifics were continued until May 11th. The atropine instillations were not discontinued until May 15th, after even the very slight morning injection had disappeared.

On May 20th, the pupil is still slightly dilated; S=$\frac{2}{3}$ with Hm.; convex glasses 0.75 D render the sight even more distinct; on the left, S=1 with an equal degree of Hm., but not improved by glasses; the former, therefore, should be ascribed to the after-effects of atropine.

In the beginning of May, patient was, moreover, attacked by a very painful angina, with circumscribed strong injection of the soft palate and pharynx, considerable swelling of the uvula, and some smaller superficial opaline condylomata upon the right tonsil. Solely by the continued employment of potassium chlorate as a mouth-wash and appropriate regulation of the diet, this affection was cured within ten days. When the patient was discharged, June 2d, indurated inguinal and cervical glands of small circumference, and the infiltration of the left cubital gland to the size of a hazel-nut, were the only indications of latent syphilis.

In the present case the diagnosis, if it had been at all doubtful, was soon, *ex juvantibus*, assured. At all events, though, with the first appearance of the scleral protuberance, coinciding exactly with the conclusion of a methodical,

correctly executed course of inunctions, two other similar affections had to be thought of, and the diagnosis rendered certain by exclusion. These were, after the first assumption of a phlyctænular process was no longer tenable:

1. A scleritic or episcleritic patch.
2. Sclerotico-choroiditis anterior, with formation of staphyloma.

While in our case a smooth hemispherical protuberance of the sclerotic appeared almost suddenly, in episcleritis there is formed—mostly under preceding change of location with gradually increasing prominence—a red, broad nodule or a yellowish elevation on a red background resembling, at the beginning, an ecchymosis, but with a characteristic violet coloration. A decrease of sensibility was likewise present in our case, and should be interpreted merely as the result of a disturbance of innervation by the pressure of the tumor on the ciliary nerves, and not, as in the other affection, as to some extent caused by the extension of the inflammation. *A lessening of the sensibility of the corneal segment adjoining the protuberance* could be demonstrated, not only in the beginning, even with and despite the great tenderness of the ciliary portion, but indubitably also on the day of the discharge, by using the point of a fine brush. Unfortunately, I had not at my disposal the baræsthesiometer of Eulenburg modified for this purpose by Molter ("Ueber die Sensibilitätsverhältnisse der menschlichen Cornea," Inaug. Diss., Cassel, 1878), to enable me to make further determinations of the impairment of the sense of touch, and to more exactly limit the portion of the cornea whose sensibility was diminished.

The following might have led to a mistake of the affection for an anterior staphyloma, respectively sclerotico-choroiditis anterior acuta and subacuta:

1. The general pericorneal swelling and deeply penetrating injection predominating at first.
2. The simultaneous simple plastic iritis.
3. The slightly bluish tinge of the sclerotic at the projecting spot, which, in the formation of a staphyloma, is

caused by the thinning of the sclerotic and the perceptibility of the underlying choroid.

But, at the first inspection, the following facts at once and decidedly excluded them:

1. The slight depth of the anterior chamber.
2. The absence of corneal opacity; and, above all,
3. The absence of increased tension. As emphasized above, the tension of the globe in the beginning was decidedly lowered.

The occurrence of the tumor in so early a stage of syphilis—four months after the supposed infection—should no longer be cited as an objection against considering the case a gumma, after it has been proved that iritis sometimes appears as the first symptom of constitutional syphilis, now and then even directly betraying itself by the presence of gummata in the iris (Mauthner, in Zeissl's "Lehrbuch der Syphilis," Bd. ii, die syphilitischen Erkrankungen des Auges). I shall enter more fully into this matter further on. I likewise cite Mauthner as authority against the possible assumption of our case as a gumma scleræ; for he says, l. c., p. 278: "The sclerotic is almost never *primarily* the seat of general syphilis. Although occasionally (v. Walton) a 'syphiloma' of the cornea and sclerotic, and, by Coccius, syphilitic scleritis, have been described, it must still be maintained that the sclerotic is almost without exception only secondarily drawn into participation by extension of a node from the ciliary body or the choroid." Moreover, Schmidt-Rimpler and Barbar express themselves to the same effect.

In our case, the early stages of the development of the gummous tumor coincided probably with the occurrence of the first symptoms of irritation in the right eye, on the last day of the inunctions; then, as Barbar (l. c.) likewise argues for his cases, the choroidal patch, covered by the iris, imperceptibly spread, and only after the sclerotic *—

* In the description of v. Hippel's case, we do not find the demonstration that gummata of the choroid are capable of protruding the sclerotic so evenly spherically as in our case—a fact which *a priori* might be doubted. Neumann, who examined the eye microscopically, found in the nodularly thickened places in the sclerotic (gummous new-formation) a high degree of cellular infiltration. "In the interstices between the fibrous elements of the scleral tissue are seen long

not so much through loss of cohesive power as through wearing away—yielded to the pressure of the tumor, suddenly came to light by the protuberance of that membrane. The development of the tumor in our case would thus have required the space of three weeks (March 14th to April 3d).

If I were to emphasize what distinguishes the case observed by myself from those of other observers, both in general and in particular, I would name the following points:

1. The universally smooth, spherical scleral surface of the tumor which was at once recognizable as such.

2. The location in the choroid. Since Merkel, in Gräfe-Sämisch's "Handbuch der ges. Augenheilk.," Bd. i, p. 44, has given the extreme length of the ciliary muscle as between 2.4 and 3.5 *mm.*, the ciliary body cannot be assumed to be the place of origin proper of the gumma, the distance of the inner limit of the scleral protuberance from the border of the cornea being 4 *mm.*

3. The complication with simple plastic, not gummous iritis. The like condition prevailed only in Estländer's case and Barbar's second, but in the latter the exudation was fibrino-purulent. In Barbar's first case, plastic iritis preceded for some time, and purulent iritis with hypopyon succeeded. The contemporaneous iritis in our case caused the general pericorneal injection; while in the absence of iritis only conjunctiva and sclerotic were injected in the neighborhood of the tumor, as is expressly stated in the first and fourth cases of Barbar's.

4. The absence of a real opacity in the corneal segment adjoining the tumor; on the other hand, the presence of

rows of small round bodies resembling lymph-cells, partly in single, partly in multiple files; corresponding to the fine streaks running parallel with the surface, which become evident on section, these cells are in a stage of fatty granular disintegration. The intercellular substance of the sclerotic had preserved its normal fibrillary structure." In the anterior lower segment of the sclerotic, corresponding to the two small roundish prominences discovered before enucleation, the medullary and soft tumor, proliferating from the ciliary body, had penetrated the tissue of the sclerotic which appeared as if teased apart with a fine needle, and showed two minute openings. Only one of the cases cited by Arlt (l. c.), of which he states that the scleral fibres had been gradually absorbed or crowded farther apart by the pressure of the exudation (gumma?), gives some explanation of the mode of origin of a spherical protuberance of the sclerotic.

impaired sensibility, perhaps simply overlooked in the other cases.

5. The brilliant success of the therapeusis with nearly complete *restitutio ad integrum*, both regarding the invaded and protruding scleral portion—which, though thinned and possessing diminished resistance, yet showed neither cicatricial contraction nor real spots—and especially in reference to the return of a not only proportionately, but almost absolutely good visual power.*

Mauthner describes, though only from memory, briefly and pointedly an identical case, barring the location of the tumor, in Zeissl's "Lehrbuch der Syphilis," Bd. ii, p. 272, "in which, during the course of a syphilitic iritis, a roundish protrusion occurred in the region of the upper external quadrant of the ciliary body. The sclerotic was so thinned at that spot that, acting as a translucent medium, it allowed a dark-bluish tint to appear which, however, admitted of no conclusion as to the color of the underlying portion. The case terminated in a gradual shrinkage of the scleral protuberance which finally entirely disappeared, leaving a slate-colored spot behind. I am of opinion that we here had a case of gumma confined to the ciliary body, which, without extending to the iris or the choroid, decayed, perhaps in consequence of the mercurialization instituted."

The description of my case seems to supplement the details to the preceding brief report; yet as it is the only quite analogous one, and as I am inclined to look upon both as strictly typical, I expected to enlist the interest of the profession by the fuller communication.

Observations differ as to the stage of syphilis in which gummous tumors occur in the uveal tract generally.

In the first of Schmidt-Rimpler's cases it is noted that the patient had suffered latterly from a severe leucorrhœa, and that on admission, four weeks before the scleral tumor occurred, condylomata at the anus, in the stage of cicatrization, and indolent enlarged lymphatic glands could be demonstrated. (Agreeing with my case.)

* Schmidt-Rimpler states of his first case that Jäger No. 17 was read with convex 6; in the second, Jäger No. 4 from 4 to 6 inches; Barbar, in his first case, S=$\frac{1}{20}$: in all the other cases the eyes were lost, in one, however, preserving the form.

In the second case of the same author, the patient, æt. 22, had had roseola about seven months previously which had disappeared without treatment, and, beside the eye affection, had copious leucorrhœa, erosions on the os uteri, rhypia on the lower extremities, swelled lymphatic glands.

In v. Hippel's case, the infection had occurred in April, 1865, and the gummous tumors were not observed until May of the following year—13 months after; but an eye affection existed already in September, 1865. Patient was 45 years old.

Estländer's case, though observed in a girl of 19, still belonged to the tertiary stage of Ricord; of the cases reported by Barbar, in the first the gummous new-formation had occurred fifteen months after the appearance of a syphilitic exanthem; in the third, however, already four or five months after the infection; in the fourth, not much later, as the first cutaneous and pharyngeal affections did not appear until four months after the iritis; in the second, the history is too defective to permit definite conclusions as to the sequence of time.

In general, then, the gummous proliferations of the uveal tract exclusive of the iris—excepting the case of Estländer which, strictly speaking, does not belong here—occurred in the train of the earlier syphilitic affections, although they should be counted as tertiary forms if we accept v. Bärensprung's classification. If we, with Zeissl, p. 80, divide into the stage of moist papules (the so-called condylomatous stage) and into the stage of gummous new-formations, then the occurrence of gummous tumors in the uveal tract in so early a period of syphilis would furnish material support for the latter classification, because in all cases, even in those occurring at the earliest period, gummous nodes in the eye developed only after the serous papules had run their course—a fact especially brought out by our case.*

The therapeutics will have to be governed by the stage of syphilis in which gummata of the eye occur; therefore,

* I desire furthermore to call attention to the fact that, as far as reported, nearly all the individuals attacked with gummous tumors of the eyes were rather young—between 19 and 26 years; only Barbar's second case was that of a woman of 33; v. Hippel's, a man of 45.

in the early state of the disease, mercury—eventually modified by sudorifics, as in our case—will be decidedly preferable to iodine.

And now, in discussing the time of origin of uncomplicated gummous iritis, I must first oppose the view of Schmidt-Rimpler, who, in the paper mentioned, states that simple plastic iritis in the great majority of instances occurs in the secondary stage (Ricord); iritis condylomatosa, rectius gummosa, however, is generally considered as belonging to one of the later stages of syphilis. Inasmuch as in two of Barbar's cases, the last-mentioned one of Mauthner's, and my own, gummata were observed in another region of the uveal tract by the side of simple plastic iritis, it would not seem possible to uphold Schmidt-Rimpler's separation of the two forms of iritis according to stages of syphilis—a view already expressed by Mauthner.

Neither do the just-mentioned cases harmonize with the doctrine of v. Wecker (Gräfe-Sämisch's "Handbuch," Bd. iv, p. 494), that iritis gummosa occurs in the transitional period between secondary and tertiary symptoms of syphilis; in the same way they, and especially my own observation, contradict the view of the same author (l. c., p. 503), that iritis gummosa occurs preëminently in those individuals in whom no treatment whatever of the syphilitic infection has been instituted, and in whom the secondary symptoms have run a typical course. In the case observed by myself, the genesis of the gumma in the choroid coincided exactly with the 24th day of a methodical course of inunctions and occurred as a sequel to an angina papulosa of a very mild type, and here, certainly, still a manifestation of the former phases of relapsing syphilis. But assuredly irido-cyclitis gummosa is to be placed in the same category with iritis gummosa, as regards the stage of syphilis.

Von Wecker, however, despite his ample experience, observed only cases in which not the sclerotic, but the iris, was pushed forward against the cornea by the new-formation. For that reason I would not in general assent to his view, that where gummous nodes develop either in the ciliary body or the neighboring choroid, and the iris has

participated in the affection only in the form of a simple plastic inflammation, the latter participates to a certain extent only indirectly; but should like to see the iris retain its place as participating equally in the specific manifestation by the side of the gummous formations; but I would accept, in this sense, the term chosen by v. Wecker for this affection—irido-choroiditis gummosa.

As it might appear that I, basing on the single case observed, have drawn too far-reaching conclusions respecting the phase of syphilis during which gummous tumors of the uveal tract ordinarily occur, and have extended these conclusions especially to iritis gummosa, I may in justification briefly state my observations regarding the frequency of syphilitic iritis generally.

In the first place I am enabled to present, if not very extensive, yet more accurate figures than have hitherto been possible, not only in reference to the proportion iritis bears to other syphilitic affections, but also in respect to the frequency of syphilitic inflammation of the iris compared with iritis from other causes, basing on the records of the hospital barracks in this city. For even Förster expresses himself very guardedly (in Gräfe-Sämisch's "Handbuch f. Aug.," Bd. vii, p. 188) on the first-mentioned subject; he simply says that physicians attached to ophthalmic dispensaries are inclined to look upon iritis as a frequent manifestation of secondary syphilis; those attached to the syphilitic wards of hospitals, as a rare one. He also mentions Tournier's assumption that iritis occurs in about 3–4 per cent of syphilitic affections.

In these hospital barracks, in the space of two and a half years (from October 1, 1877, to March 31, 1880), as shown by reliable records, there were, with a fluctuating garrison of about 12,000 men, among 10,000 inmates, 1,527 patients with syphilitic and other sexual affections; of these, 382, *i. e.*, 25 per cent., had constitutional syphilis, including the syphilitic initial sclerosis (indurated chancre). Of syphilitic iritis, in the same space of time, 4 came under hospital treatment. These figures may be taken as almost absolute, as with the strict supervision prevailing in the military, all syphilitic and

ophthalmic patients are removed to the hospital. Accordingly, the proportion of iritides to other syphilitic affections reaches only 1.05 per cent.

Despite the proportionately rare affection of the iris in syphilis, syphilis was almost exclusively the cause of iritis. For among the 380 eye patients of the garrison in the above space of time, there were—if we except the induced forms accompanying corneal processes—altogether only five iritides, so that the four syphilitic ones amount to 80 per cent. of the whole—a proportion even exceeding that assumed by Mauthner at from 50 to 60 per cent.

(Among the four syphilitic forms, in the first case, in a corporal of 21, the iritis had occurred successively in both eyes 4–5 months after infection, in the course of an articular rheumatism, and at first had healed without leaving synechiæ behind, no mercury having been employed. A relapse occurring with angina was quickly made to yield by inunctions. The second case, in a private of 23 years, had been treated in the hospital nine months previously for indurated chancre; the affection was bilateral, free from complication; on discharge no enlarged lymphatic glands could be detected. The third case was one of relapsing iritis, synechiæ having been left behind from a year previous, in the right eye of a private, æt. 22, free from complication. In the fourth case, the iritis had occurred, together with a papulous syphilide, four weeks after healing of a chancre, in a corporal, æt. 22. All cases were simple plastic inflammations with violent irritation, and belonged to an early stage of syphilis.)

I would, however, consider the percentage of syphilitic iritis as compared with other syphilitic affections, which I have calculated, as figured decidedly too low, if I take the following circumstance into account: In the short term of service of our soldiers, which, excepting the few corporals, does not exceed three years, the symptoms of the first epoch of lues only are likely to come under our observation in the hospital barracks, for the later (tertiary, Ricord and v. Bärensprung) ones do not appear until after the men have reëntered their civic conditions more or less

long. However, as iritis, with or without gumma, as Mauthner (l. c.) correctly observes, sets in, on the one hand, along with the first symptoms of syphilis—*i. e.* after the stage of moist papules which frequently remain unnoticed—and may occur, on the other hand, as one of the very last symptoms in any later stage of lues, at a time when all other phenomena have disappeared for years, the above percentage of 1.05 refers solely to the iritides belonging to the first epoch of syphilis. Accordingly, if Tournier's assumption of 3–4 per cent. is not too high, syphilitic iritis must still preponderatingly belong to the later tertiary stage. This is, however, at variance with my experience in general medicine.

MUNICH, June 20, 1880.

INTRA- AND EXTRA-OCULAR ENDOTHELIOMA.

(From the Ophthalmological Clinic of Prof. S. Hirschmann, of Charkow.)

By PAUL BARABASCHEFF, Assistant Surgeon.

(*With Plate VIII.*)

Translated by Dr. W. C. Ayres, of New York.

THE number of cases of endothelioma of the eye which have already been published is very small. I know of only three, viz., one of Reich,* one of Schott,† one of Alt,‡ and since the following case differs from all of these, both as to its location and clinical features, I think it so much the more worthy of a description. The patient was treated at the clinic of Prof. Hirschmann, to whom I am indebted for the subjoined clinical history and the privilege of examining and describing the specimen.

Bas. Michailikow, æt. 40, a peasant, entered the clinic September 23, 1878. He was strong, well developed, and well nourished. All his organs normal.

The condition of his eyes was as follows: The right slightly hyperopic, but otherwise normal. In the left, the conjunctiva was hyperæmic and the bulbar portion strongly injected. A few episcleral vessels greatly dilated and tortuous. The corneal epithe-

* M. Reich, Zur Pathol. des Sehnerven. *Graefe's Arch.*, Bd. xxii, Abth. 1, pag. 103.

† Endothelioma of both Optic Nerves, by R. Schott. *These Arch.*, vol. vi, p, 262, etc.

‡ A Case of Endothelioma of the Intervaginal Space of the Optic Nerve, by Dr. A. Alt. *These Arch.*, vol. vi, p. 367, etc.

lium slightly clouded and uneven. The cornea apparently somewhat flattened; anterior chamber filled by a dirty, opaque round body, with sharply-defined edges resembling the form of the lens; the iris lay behind it, but could not be distinguished. The eye had its normal motion in every direction; was rather a little sunken, and painful on pressure in the region of the ciliary body to the nasal side.

Tonus increased + T_2. S=o. No perception of light.

According to the statement of the patient, seven years ago he received a severe blow with the end of a pole on the left temple, in consequence of which the left eye suffered. He was unconscious for four hours, after which he remarked that he saw badly with the left eye, in which he experienced great but transient pain.

Since that time his vision gradually decreased, and for the last three years he had no perception of light.

About five years ago, both before and after the blow, he had noticed a periodical decrease in his sight, combined with vertigo. All objects were indistinct to him, and a part of each object appeared to be wanting. The outlines seemed also to glitter. This condition lasted usually about ten minutes, when it passed off, leaving a slight headache which lasted a short time. It happened only once or twice a month. He was evidently suffering from scintillating scotoma.

During the last two years he had frequent pain in the region of the ciliary body accompanied by severe headache, occurring in the shape of attacks which grew more intense and frequent, lasting sometimes several days. The intermissions becoming always shorter, he decided to apply to the clinic for relief.

It was evident from the examination and history of the case, that the lens had been dislocated into the anterior chamber by the blow, and had there caused symptoms of secondary glaucoma. The recurring pain is also to be accounted for by glaucomatous attacks. The slow decrease of sight in the beginning resulted from the cloudiness of the lens, and the total blindness from the glaucoma.

Enucleation was proposed, and willingly agreed to by the patient, and on September 26th, the operation was done by Prof. Hirschmann, under chloroform narcosis.

The following peculiarities occurred during the operation: After the conjunctiva was cut, it was difficult to pass the strabis-

mus hook under the tendon of the internal rectus, the hook meeting with an obstacle which, in yielding, gave the impression as though a fibrous membrane had been ruptured. After the tendon had been divided, a small hard tumor, the size of a bean, was seen at its place of attachment to the eyeball.

The remainder of the operation was carried out in the usual manner, so that the tumor was removed with the eye, and on account of its presence, the optic nerve was cut close to the optic foramen. The optic nerve offered considerable resistance to the scissors.

On examination of the orbit with the fingers nothing suspicious was found. After the operation the patient experienced much relief, his headache was less, and disappeared entirely after two days. He slept well and had a good appetite. The wound healed quickly under moderate suppuration.

Twelve days after the operation, the patient was dismissed in a satisfactory condition.

In the enucleated eye we noticed the following:

On the medial (nasal) side there was a tumor the size of a bean, whose anterior end reached to the insertion of the rectus internus muscle.

The eye having been cut open in a sagittal direction, showed the anterior chamber completely filled by the hard cataractous lens, and the iris pushed backward. The whole retina detached, remaining fastened only to the ora serrata and the papilla. It was converted into a nodular, flocculent and ragged mass. The choroid was free all around the globe.

The space between the choroid and retina was filled by an opaque brown fluid, which ran out when the eye was opened. In the fluid were found nuclei and fat cells. Under the microscope there were great numbers of pigmented nuclei, also nucleated pigment bodies; isolated nuclei; detritus, and parts of the fatty degenerated retina.

The optic nerve degenerated, very thick and uneven.

The eye was placed in Müller's fluid to be hardened. After hardening, the globe was 28 *mm.* in its long axis, 23 in its vertical, and 24 in the horizontal transverse diameter. The cornea 11½ *mm.* vertically, and 12 *mm.* horizontally.

The extra-ocular piece of optic nerve measured 14½ *mm.*, and had a diameter of 7 *mm.* vertical and 6½ horizontal at the end towards the orbit; close to the bulbus, 10 *mm.* vertical, 8½ *mm.* horizontal.

The dimensions of the tumor were:

Length, 10 *mm.*; breadth, 5–6 *mm.* (broader anteriorly than posteriorly); thickness, 6 *mm.* It was hard to the touch, had an uneven surface, and was of a dark color. It was intimately connected with the sclera, and the sclera itself below the tumor was thinner than normal.

On examination with a loupe, we could distinguish that bundles of fibres of the outer layer of the sclera passed into the tumor, and divided themselves into small divisions forming partitions.

Between these partitions the mass of the tumor was dark in color. The section of the tumor, already hardened in Müller's fluid, shows the following:

From the sclera we notice division-walls running radially through the whole tumor. They are much lighter in color, but enclose a dark-colored mass, which has a few white spots scattered about in it. The dark parts were harder to the touch, and the white were granular. The section of the optic nerve showed the same condition both as to color and consistency.

The microscopic examination was made with Hartnack's systems 7 and 5; ocul. 3. The drawings are very accurate, having been made by Prof. Krylow, with the drawing prism; and I here return thanks to Prof. Krylow for his assistance.

The examination gives the following:

Those parts which we have seen to be dark in color, microscopically are composed for the most part of large spindle-shaped cells, which lie close to one another in thick layers.

The contours of these cells are not sharply defined; and their protoplasm is finely granulated. Some of the cells have as many as five prolongations, which are still more indistinct than the cell contours. The cells are flat; by slight pressure on the covering glass we notice other iso-

lated cells, which travel about and which lie sometimes on their edges and sometimes on their sides, looking like fibres with nuclei, or like flat, oval or spindle-shaped cells, according to their position, The nuclei are bright, and reflect light strongly. In a few of the cells we can notice spaces in the nucleus which look like vacuoles. Some cells have as many as four nuclei, and some of the nuclei three or more nucleoli.

We also frequently find cells in the process of proliferation, where a large mother cell contains several nuclei; in each one of these cells the protoplasm is plainly divided around each nucleus by a line of demarcation, but the division is not quite complete.

Here and there we find young cells almost complete within the mother cell, and the mother cell itself just ready to fall to pieces.

Other mother cells carry within them new cells already complete. A few giant cells are to be seen with 6–8 nuclei, and many other cells are filled by a celloid substance which pushed the nucleus out of place.

Besides the spindle cells already described, we find also many round, oval, and irregular polygonal bodies, and many of the cells contain granular pigment.

Sometimes the cells lie in groups, close together and without any intercellular substance, and sometimes they have an alveolar stroma in which they are embedded. This stroma is either made up of delicate fibres, or is composed of many small connective-tissue cells with oval nuclei, which lie between the fibres. Blood-vessels are very scarce. They are accompanied by striated bundles, which, when they are broken, show themselves to be made up of flat endothelium.

All the above conditions are found in the dark parts of the tumor. The white parts show the same peculiarities, except that the cells are smaller, their contours less distinct and the protoplasm more granular.

We also find isolated nuclei and detritus in the white patches, but pigment cells are not so frequent.

In these white parts the cells are undergoing fatty degen-

eration much more rapidly than in the dark, and their nuclei are scarcely discernible or are altogether wanting.

Preparations from various parts of the optic nerve show the same elements as the tumor on the globe. According to the direction of the cut, we see the cells round, oval, irregularly polygonal, or in the shape of short, thick fibres. (Section perpendicular to the surface of the cell.) In this last condition they look like sclerosed connective-tissue fibres, and are only to be distinguished from them by the thickening produced by the nucleus.

Here and there we notice a delicate fibrous alveolar stroma, with connective-tissue cells. The cellular elements have the same structure as in the tumor, *i. e.*, granular protoplasm, indistinct contours, and strongly refracting nuclei. The cells in the optic nerve are somewhat smaller than those in the tumor.

As many of the elements of the section looked like ganglion cells, reagents for nerve tissue were resorted to, but with negative results.

The retina, which was fatty and unnatural in shape, was made up, for the most part, of detritus and of isolated granular nuclei, either round or oval. Cells were scarce, but when present were of the same character as those in the optic nerve and the tumor, only they were more granular and had less distinct contours.

In some localities we also see a delicate fibrous stroma which is, however, not so regular as that in the tumor. In the detritus we find fat drops, but retinal elements are nowhere to be seen.

In the choroid there is nothing abnormal. The pigment epithelium adheres to it in the shape of small islands, but is, for the most part, entirely destroyed. The lens and cornea are normal.

From the above description we observe that the new-formed tissue is the same in the tumor on the sclera as in optic nerve, being composed in both places of the same elements, and having the same structure. We also find similar formations in the retina. The elements are everywhere flat cells which have the character of endothelium, but in

the different localities they are at different stages of development.

We, therefore, think it proper to classify the tumor as an endothelioma, and the remaining characteristics need not be mentioned.

On December 20th, or three months after the operation, the patient presented himself at the clinic again, with a relapse, so that the whole orbit was filled with the pseudoplasm. The conjunctiva was much inflamed and pushed forward between the lids, which were greatly swollen and of a blue-red color. For three weeks the pain has returned and has extended to the whole corresponding half of the head. Subcutaneous injections of morphium afforded only temporary relief.

He entered the hospital, where the tumor developed rapidly and soon became ulcerous. He left again and died in the country a few weeks later with cerebral symptoms.

EXPLANATION OF THE DRAWINGS.

Figs. 1, 3, 4 are drawn with Hartnack 7 and the camera lucida. Fig. 2, with system 5 and the camera.

Fig. 1, *A*.—Isolated cells from the tumor. $\overline{aa}$ cells in the process of division. *B*.—Isolated cells from the optic nerve.

Figs. 2 and 3.—Two sections of the tumor. $\overline{aa}$ trabeculæ; *bb*, the mass which fills the alveoli.

In the connective-tissue stroma we notice cells which lie on their edges and appear long and spindle-shaped. In some places we have the cells closely packed together without any intercellular substance.

Fig. 4.—Section from the optic nerve. The cells are of the same character, only a little smaller. Here, also, we find cells in the process of division (*a*).

THE MORPHOLOGY AND GENESIS OF PSEUDO-COLOBOMA IRIDIS.

(From the practice of Dr. Samelsohn, of Cologne.)

Communicated by Dr. von MITTELSTÄDT, Assistant Surgeon.

Translated by Dr. W. C. Ayres, of New York.

(*Two Wood-cuts.*)

THE numerous observations and accurate descriptions of coloboma of the inner tunics of the eye refer mostly to the marked forms of these defects of development, whereas the more accessible rudimentary colobomas of the iris have received less attention.

The description of the two following cases would nevertheless be of but little value were it not for the light which they seem to throw on the embryological position which these rudimentary forms occupy in the series of colobomas of the iris. For the privilege of publishing them I am indebted to Dr. Samelsohn.

Case 1.—*Pseudo-coloboma Iridis extern. sinistr.*

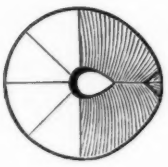
Mrs. M., æt. 40, who says she has never suffered from eye disease, presented herself on September 8th last with the usual conditions of conjunctivitis pustulosa in the left eye; with this exception, both eyes were normal, as found on O. S. examination. In the left we notice the following peculiar anomaly of the iris: Its color is a greyish-blue, but shows a sector on the outer half, which passes over to a pure gray. Simultaneous with this change of color the thickness of the iris tissue is diminished in this direction, so

that the oblique fibres which usually cross each other are entirely wanting, leaving only a thin layer of radial fibres.

This difference in thickness is most observable at the margin of the pupil. The inner half of the pupil is surrounded by a well-defined sphincter, while on the outer there is only a thin border of brown pigment in which the radiating fibres end.

The pupil shows a slight outward ectopia, is as wide as in the right eye, and reacts promptly to light. It is circular only in the inner half, while the outer runs to a point like the pupil of a cat, in such a manner that *the angle has its point directly outward*, and the horizontal diameter of the pupil is one-third larger than the vertical. A shallow groove (raphe) runs from this point, exactly in a horizontal direction outward, but does not extend so far as the ciliary margin of the iris. This groove is produced by the union of the radial fibres which alone make up this part of the iris. I call them radial in a morphological sense and not from their direction.

While the direction of the fibres in the inner half is normal, the outer ones take the following course: Those which in a normal iris should run from above and below to the pupil in a vertical line are slightly bent outward. All those which end in the pupil run almost parallel to these, being a little concave inward. The remainder do not reach the pupil at all, but unite in the horizontal line, and have a course slightly concave above and below as in the accompanying figure. The groove and all the horizontal fibres disappear in a small triangular membrane, whose basis is inserted into the ciliary margin, and whose apex is precisely in the direction and at the peripheral end of the pseudo-coloboma.



This membrane, which is a little elevated above the plane of the iris, is of the same color and structure as the fibres which run from the ciliary insertion toward the apex of the triangle and there unite. They are consequently a continuation of the adjacent fibres of the iris.

Atropine widens the pupil tolerably well, whereby the ectopia and the external triangle are somewhat lessened. The refracting media and the interior tunics of the eye are normal.

CASE 2.—*Coloboma Iridis completum intern. sinistr., superficiale intern. dextr.*

H. H., æt. 18, presented himself September 11th on account of chronic conjunctivitis. He came from a healthy family in which no congenital malformations are known.

Status præsens. Both sides nystagmus horizontalis, which is quickest on its outward motion. Both eyeballs are alike, and smaller than normal in the transverse diameter ; in the axial, perhaps, a little longer, on account of a conical protrusion of the anterior segments.

The corneæ are perfectly clear.

Left eye. Iris of a brown color, showing a total coloboma, the limbs of which, about as far apart from each other as the diameter of a medium-sized pupil, run directly inward.

Both the circular and radial fibres in the outer half of the iris are normal in their direction. The inner half (near the edges of the coloboma) seems to be thinner, and the stroma made up of numerous fine fibres, which insert themselves into the edges of the coloboma. The lens is cataractous and dislocated upward and inward. There is no iridodonesis.

On the use of atropine only, the outer half of the pupil dilates, as is to be expected from the direction of the fibres.

There is also a coloboma of the choroid, running downward and inward. It is oval in shape, and has its grayish-white surface traversed by a few bright-red blood-vessels. Its contour is sharply defined. Its breadth is about one-half its length, its length being two diameters of the papilla. A closer examination was not possible on account of the nystagmus.

Right eye. The iris is of a grayish-brown color. Pupil central, somewhat contracted, immovable, without a trace of a sphincter. Only radiating fibres present.

Precisely in the horizontal line, inward, we find a superficial coloboma of the same size and form as in the other eye, into the side of which the radiating fibres insert themselves also in the same manner.

The bottom of the coloboma is composed of a light grayish-brown tissue, which has distinct horizontal fibres, showing a picture similar to that which we often see after iridectomy in surface synechia, where only the superficial layers of the iris have been drawn out.

At the ciliary attachment the iris has a surplus of tissue. The radiating fibres are here concealed beneath a small triangular membranous projection, the apex of which is driven out into a

point extending toward the middle of the cornea, inserting itself into the membrane of Descemet. This membrane is absent in the area of the superficial coloboma.

Ophthalmoscopic examination was impossible on account of the narrowness of the pupil. Atropine did not act.

Sr=quantitive, with projection upward and inward.

Sl=fingers at 1′.

REMARKS.

The above facts are interesting not only on account of their bearing on the question of the mode of production of pseudo-colobomata, but also from the peculiar position of the defect. The most frequent locality for coloboma of the iris is below, and any other position at once produces a doubt as to the true nature of the anomaly. Manz * expresses this by saying:

"The history of development requires that the fissure in the iris should be below. There are records of cases where the coloboma has not this position, but they would have to be examined more carefully before we could recognize them as deviations from the established law of development."

In the two cases just cited the position of the coloboma deviated from the established rule. In Case 1 we find a pseudo-coloboma in the *horizontal meridian pointing outward. In Case 2, a complete coloboma in the left eye and a superficial one in the right, directly inward.*

In the left eye there is an accompanying coloboma of the choroid, downward.

In regard to the genesis of these colobomata, I do not think that the hypothesis of Huschke, according to which the choroidal fissure, during the successive stages of development, turns from the nasal side downward, can hold good, for the directions of the defect in the choroid and iris (Case 2, left eye) are almost at right angles to one another.

Neither can the theory of Stellwag,† according to which

* Graefe-Saemisch Handb., Bd. ii, Theil 2, page 65.

† Die Ophthalmologie vom naturwissenschaftl. Standpunkte aus. Bd. ii, Abth. 1, page 184.

an incomplete development of the choroid produces a coloboma of the iris, account for this unusual position, nor can an imperfect union of the walls of the secondary ocular vesicle produce it.

If we take into consideration the various opinions held on the subject, the difference between a pseudo-coloboma and a complete coloboma is one of degree, both defects being brought about by the same process, viz., a total or partial failure in the closing of the embryonic ocular fissure.

The question of interest then *is whether and in what manner a transition of one form into the other takes place, and which is to be considered the primary stage?*

The answer to this question is given when we explain the existence of a defect in the iris where none in the choroid exists, or what is much more seldom, a coloboma in the choroid without a corresponding defect in the iris. In these we must consider that they both existed simultaneously at one period, but that one of them disappeared later, or that they both closed in the beginning, while one of them gave way to the intra-ocular pressure and subsequently opened.

This is, however, a matter of speculation which has but little value in the absence of objective observations.

It is evident, *q priori*, that only a complete coloboma can be a primary defect, that is, as long as it depends upon the retinal fissure. It is also evident that the development of the iris, where the retinal fissure is still open, can only lead to the formation of a coloboma, that must always be the beginning of a complete coloboma.

Its subsequent form and dimensions will principally depend on the cerebral plates, whose influence we notice in the closure of colobomata where the fœtal retinal fissure remains open. Such is the case in bridge-colobomas and in defects in the iris which do not extend so far as the ciliary margin, but which, nevertheless, are combined with colobomata of the choroid.

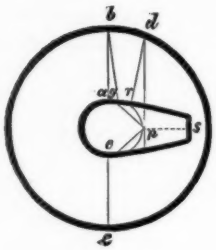
In Case 1 we notice the following particulars:

1. The course of the fibres on the outer surface.
2. The form and ectopia of the pupil.

3. The ciliary triangular membrane,

which points to a preëxistence of a complete coloboma, whose slightly converging termination did not reach to the ciliary border, the sides of which had been drawn together (cicatricial traction?) and had closed in the horizontal raphe.

The accompanying figure is intended to show this mechanical traction. It also presents a coloboma of the iris of the form under consideration; *a b* and *c e* are vertical, and *r d* another radial fibre. The fine semicircular line is the continuation of the edge of the pupil, and the dotted line the pseudo-coloboma.



If we imagine that in the coloboma there is an interposed tissue which, in shrinking, brings the ends of the coloboma together, that is, *p* and *s* approach each other, we will have precisely the picture presented by our pseudo-coloboma.

The consequence of such a cicatrization would be: (1) the radiating fibre *rd* would be pulled toward *pd*; and (2) the margin *ar* would be drawn to *ap*, and the upper and lower halves of the outer pupillary margin would become stretched as tight cords of the segment of a former circle; (3) it is evident that the traction, working strongest in the region of the edges of the coloboma, would pull the fibres in this vicinity outward, which would be shown in the deviation of the vertical fibres (*ab* toward *bg*), and the ectopia pupillæ.

This would take place independent of any horizontal traction, but that this last force is also present, we notice in the triangular membrane in the periphery. This membrane is to be considered as a folding of that part of the normal iris, which lies between the base of the coloboma (which before was complete) and the ciliary body. In this membrane there is nothing in its color or the condition of its fibres to distinguish it from the rest of the iris.

The evident effects of traction as described above, point

to the complete coloboma as being the primary condition.

If this be true, the pupil may be compared to a rudimentary coloboma in which, on account of a defect in the sphincter, the traction of the radiating fibres would produce an angular notch in the pupillary margin.

Such a coloboma can be easily produced experimentally. If we cut the sphincter in the eye of a rabbit, we produce precisely the same defect as in our case, the direction of the fibres being reversed. Where we have a cessation in tension, if we cut in a horizontal direction outward, the angles of the sphincter will be carried upward and downward, and also the ends of the neighboring radiating fibres which are inserted into the pupil.

The pupillary ends of the radiating fibres are crowded together, where, as in our case (the form of the pupil being the same), increase of the tension at the outer pupillary margin causes the fibres to be pulled away from one another.

Although there is very much in favor of the above-described mode of production of a pseudo-coloboma, the origin, and method of formation of the supposed intercalary tissue, are not explained. It is possible that this is the same tissue that forms the bottom of a superficial coloboma, or it may have its origin from such a tissue.

Another possibility is that it has its origin in the formation of the embryonic iritis, the remains of which we have seen in Case 2 (*R. E.*).

There is no simpler reason for the circular attachment of the iris in the periphery, than a long continued closure of the pupil, with a consequent expansion of the posterior chamber by an exudation.

If this becomes absorbed, or a communication between the anterior and posterior chambers be reëstablished, that portion of the iris which was pushed forward would then be drawn backward, and at the border of the adhesions between the iris and cornea the iris would have an angular bend in the shape of a circular folding.

Precisely the same picture was seen in a case which came under observation a day or so later in a young lady, 22

years of age. In the left eye, buphthalmus acquisit.; right, iridochoroiditis chronica, coloboma artificiale externum dextrum, in the area of which was a brown pseudo-membrane on the anterior capsule, with circular posterior synechia. The peripheral portions of the iris (with the exception of the coloboma) were attached to the cornea, almost in a circular anterior synechia. At the edge of this attachment, or just before it bent down to lie on the anterior capsule, the iris was sharply indented, and drawn out into points in the same manner as the right eye of Case 2.

After the iridectomy, the exudation which had distended the posterior chamber for a long time flowed out, while the attachments of the iris and memb. Descem. were not broken.

To recapitulate briefly, in Case 1 we find a pseudo-coloboma, which was produced by a complete or superficial coloboma, as is seen in Case 2, which, on its part, was brought about by the remains of embryonic iritis, and caused the transition of the one form into the other.

We must, therefore, consider pseudo-colobomata not as the first processes in the formation of colobomata, but as the last remains of the embryonic ocular fissure which is tending toward closure.

OBSERVATIONS ON COLOR-BLINDNESS.

By Dr. E. PFLÜGER,

PROFESSOR IN BERN.

Translated by Swan M. Burnett, M.D., Washington, D. C.

(*Plate IX.*)

THE great variety of opinions which have lately been put forth in regard to the color question, and particularly that of color-blindness, from a theoretical as well as a practical point of view, has caused me to subject a number of colored-blind persons to a variety of tests.

I hoped by this to further the practical side of the question by enabling us to form a just judgment as regards the value of the various methods of examination, and to furnish some data for a choice between the two opposing theories of color-perception at present occupying attention.

Since my observations in reference to the first point have not been entirely without a result, and, furthermore, since only some of the hitherto not generally received methods have proved useful, I beg to submit my experience to the judgment of my brother-oculists.

Some of the individuals were examined by a number of methods, while others were tried by a few only.

EXAMINATION BY THE SPECTRUM.

Besides the direct solar spectrum, I used also Hirschberg's double spectroscope with gas-light.

1. Mr. A. S. Solar spectrum of normal length when the light was intense, but when the spectrum was weak from faulty position of the heliostat, and also in the spectroscope, the red and violet ends were cut somewhat short. Only two colors were distinguished, yellow and blue, in varying degrees of brightness. The brightest points corresponded to the true yellow and blue, the maximum of brightness falling in the yellow. When a small band of red was isolated by a Vierordt's slide, it was seen as the same with both eyes, and yellow was laid beside it as of the same color. When looked at by the left eye through a cobalt glass, it appeared as an undefined color (yellowish or bluish), and there was no colored wool which he could find that was analogous to it; to the right eye the same band appeared reddish, and a red wool (*H II b**) was laid beside it. An isolated green band was matched with yellow by each eye separately; through a cobalt glass this band was seen by the left eye as grayish and was matched with green (*H* 9–*a*); it was seen by the right eye as bluish and matched with blue (*H* 6–*a*). Above the isolated red band in the lower fixed spectrum, a green band of the upper movable spectrum was placed as the same color, with the remark that it was somewhat brighter than the lower.

2. Mr. B. S., a brother of A. S., also saw the spectrum of normal length when it was intense, but shortened at both ends when it was weak; it contained only yellow and blue, which, at the limits of the blue-green and green passed over into each other. The maximum of brightness was in the yellow. An isolated red and green band were, with the naked eye, as well as through a cobalt glass, seen and matched with yellow, but through the glass the shade was darker.

Both eyes were the same, and the green and red bands of the two spectra were declared to be identical.

3. Mr. W., physician, saw both ends of the spectrum not shortened, and distinguished red, yellow and blue clearly from each other, but was not able to identify green. Yellow and blue appeared to be separated from each other by an ill-defined grayish zone in the bluish-green. Maximum of intensity in yellow.

4. Mr. O. Solar spectrum not shortened; the gas spectrum, with a somewhat shortened violet end, was seen as three colored

* *H II b* is the *II b* test of Holmgren's color-table. The letters added to the Holmgren designation mean the different shades of the colors in question; *a* signifies the next darker, *b*, one yet darker, etc. :—*a*, the next brightest shade of the same color, etc. Wools numbered in this manner are used in the examination for color-blindness by some of the Swiss railway companies.

(red, yellow and blue), and matched as such. An isolated red band was seen by the naked eye and through a cobalt glass as red, and matched by a red wool (*H II* 6) ; an isolated green band was seen by the naked eye and matched as yellow, but through a cobalt glass was matched as blue, but with different shades with each eye separately ; maximum of brightness in yellowish-green, and removed 3–4 degrees further toward the left on Hirschberg's apparatus than in the three preceding cases. Spectral green was matched with spectral red, though the former appeared brighter.

5. Mr. St. Solar spectrum of normal length, but the gas spectrum was shortened at the violet end ; it contained red, yellow, green and blue, which were matched with saturated shades (*H II* b_a, 3_b, 6 and 9_a). Against the presumption that the spectrum should appear to him as dichromatic St. protested most vehemently.

An isolated red band was seen and matched as red, but was seen through a cobalt glass as a darker shade. An isolated green was matched with green with the naked eye, as well as when the cobalt glass was used. Maximum of brightness in orange. In the double spectroscope the two red bands were superposed as identical. When the red and green bands were superposed, and he was asked if they had any similarity, he thought we were joking and named the two bands correctly.

6. Mr. R. A brilliant spectrum appeared of normal length, a feeble one was shortened at the left end and appeared as red, yellow, red and blue. An isolated red band when seen through the cobalt glass was designated as dark red and matched with red (*H II b*), and green (*H* 9_a) wools. An isolated green band when seen with the naked eye was called red, and matched with *H II b* and 9 ; when seen through a cobalt glass it was also denoninated red and matched with *H II* b_a and 9_a. Maximum of brilliancy in yellow.

7. Mr. O. R. A member of the family reported by Horner with the peculiarity of transmitting the defect of color-blindness from the father through the daughter, who was not affected, to all her sons. The solar spectrum was dichromatic, containing yellow and blue. Maximum of brightness in the yellow-green. Red end of an intense spectrum shortened to a point nearer the *C*-line than the *B*-line ($\frac{1}{3}$ C_u $\frac{2}{3}$ *B*). The left end of an intense spectrum normal, but by a diminished intensity it was shortened to *G*, while to the normal eye it was of proper length. In Hirschberg's apparatus red was placed above red as of the same color.

8. Mr. G. R. Showed the same phenomena as his brother O. R., with the exception that the red end of the spectrum was shortened only to *B*.

9. Mr. O. R., Jr., nephew of the two preceding, gave the same phenomena as his uncle G. R.

10. Mr. K., a cousin of the last three mentioned, has also the right end of the spectrum shortened. Unlike his kinsmen, Mr. K. distinguishes red, yellow and blue, and sees, like Mr. W. (No. 3), a faint gray band in the bluish-green. Maximum of brightness in bluish-green. An isolated red band was seen through a cobalt glass, with both eyes as grayish-red and matched with $H\ 2_a$; a green band when seen through a cobalt glass was seen as purple (rose), and matched with $H\ 5_a$ and 12_a. Spectral red and bluish-green were superposed as identical.

11. Dr. Z. Spectrum shortened at the right end to *B*, and contained red, yellow, green and blue. Maximum of brightness in the yellowish-green. Spectral red was superposed on red as similar, but on no other color.

In the above series of examinations, the first six individuals have this in common, that for them there was no shortening in a bright spectrum and that the maximum of brilliancy lay in the yellow (for Mr. St. in the orange). According to Donders and others, we should have diagnosed green blindness. The last five of the series have a shortening of the red end of a bright spectrum, and the maximum of brightness is for them moved toward the left into the yellow-green. According to the same theory, these five cases must be set down as red-blind.

If the shortening of the red end of the spectrum and a certain position of the maximum of brightness are to be used in dividing Daltonists into red-blind and green-blind, it is to be expected that yet other characteristics should be found which would differentiate the one kind of color-blindness from the other. The above cases, however, show that certain essential qualities belong to representatives of both classes, and, on the other hand, great differences are to be found in the same class, with smaller differences between relations, between brothers and even between the two eyes of the same individual.

A common characteristic of all the eleven examined, is that violet was designated as blue. Further, a large number showed a shortening of the left end of the spectrum on a diminution of the intensity of the light, while to a normal-sighted eye there was no such shortening.

It is interesting that a green-blind (W. No. 3) and a red-blind (K. No. 10) saw a neutral gray band in the blue gray which the others did not.

In both classes there are to be found individuals to whom the spectrum is unqualifiedly dichromatic.

Mr. St. (No. 5) without, and Dr. Z. (11) with shortened red end of the spectrum, distinguished the spectral red, yellow, green and blue; they not only designated these colors by the right names, but matched them with saturated shades. And when an isolated band of these colors was brought before them, there was no confusion in matching them, and in the examinations with Hirschberg's apparatus the same bands were superposed as identical.

They laughed at the idea that according to the theory they should see the spectrum in only two colors, though of varying shades of intensity.

Among those who superposed the spectral red and green as identical, there was either no difference in intensity discerned, as by R. (6) and K. (10) or the green was remarked as being brighter. A. S. (1), B. S. (2), C. (3), C. R. (7), and G. R. (8), who superposed the two spectral reds, remarked when I brought the green band about the red one that the upper band was brighter than the lower None of those examined saw the red band brighter than the green.

The examination of isolated red and green bands through cobalt glass, for the purpose of eliminating the yellow rays in case any should enter either through a faulty adjustment of the instrument or on account of the too great width of the slit, led to various results.

These examinations were made on six individuals, five of whom belonged to the so-called green-blind (A. S., B. S., O., St., R.), while the sixth (K.) had a shortening of the right end of the spectrum. I had at my disposal a saturated cobalt glass 4.5 *mm.* thick, and others of less thick-

ness and saturation. The one of 4.5 *mm.* thickness, to which I usually added a thinner one, removed the yellow from the spectrum entirely. To the normal eye armed with this glass, the spectrum appeared composed of red, dark bands, yellowish-green, smaller dark bands, bluish-green, blue and violet.

B. S. named and matched the green band with yellow as well as red, a case of typical xanthokyanopsia. K. matched the red band with brownish-gray ($H\ 2_a$), the others matched it with red, while R matched it with green. The green band was matched by A. S. (left eye) with green as also by St., K. and R.; by the last also with red: by O. and A. S. (right eye) it was matched with blue.

St., who recognized red, yellow, green and blue in the spectrum, also matched the isolated bands correctly.

R., who saw red, yellow, red and blue in the spectrum, also remained consistent, matching the red and green bands with red and green.

K., who recognized the brighter shades of red as red in the spectrum, and as we shall see further on in Radde's index, saw through the cobalt glass the subdued red band as brownish-gray, but matched the green band with green, while the spectral green when seen through the cobalt glass called forth an anomalous impression.

A. S., on the other hand, who had a pure dichromatic spectrum, in Radde's index distinguished the brighter shades of red as red, and matched the red band with red, and the green band, in the left eye, with green.

Finally, O., who distinguished red, yellow and blue in the spectrum, matched the red band correctly, but the green band only with blue wool.

Had O. matched blue alone, I would have explained it by the fact that the slit was over a greenish-blue, in which the blue predominated. This explanation, however is hardly tenable because A. S. matched the same green band with green with the left eye, and with blue with the right.

A. S. was himself quite struck with the difference in the color-perception in the two eyes. This difference in the color-perception of the two eyes of the same individual can,

as is now known, express itself in monocular color-blindness. Some years ago I had the opportunity of examining a gentleman hurriedly during a consultation, who was unmistakably color-blind in one eye, while the other eye distinguished colors quite correctly, a functional anomaly which had been known to its possessor for many years.

From this series of examinations it again becomes evident how great are the individual differences in cases of red-green blindness, and how fruitless the endeavor to unite the numerous varieties of the ordinary class of color-blindness under two well-characterized subdivisions.

The shortening of the red end of the spectrum and the relative brightness in the separate parts, can scarcely explain the great difference in the appearance of the spectral colors to the different individuals. The curve of the relative brightness for the red- and green-blind cannot be typical, because (1) the shortening of the red end of the spectrum is by no means the same in all the cases; and (2) because the maximum of brightness for each subdivision fluctuates considerably within a certain space.

Completely green-blind people, Donders says, distinguish in a methodical examination five points in the solar spectrum: Points 1 and 2 are the limits of the two ends of the spectrum; 3, the neutral line *n*, which appears gray; and 4 and 5, the localities which correspond respectively to the yellow and blue. A gray neutral zone was observed in only two cases, once in a red-blind, according to the theory, and in a green-blind in the other.

Donders says further: "A comparison of the fixed with the movable spectrum shows that for the green-blind, the colors on either side of the neutral band remain unaltered. On the other hand the red-blind often begin, at the junction of the orange and red, in an equal illumination, to distinguish a difference in color, which is seen in the movable spectrum as red, and in the stationary one as yellow." I have not been able, as is seen from the detailed cases, to verify this law by my own observation.

INDEX OF RADDE'S COLOR-CHART.

The results of this examination were as follows:

D. Z. called each shade of Radde's index, without exception, by its proper name.

As in the examination with the spectral colors, there was here a great variety in the answers given; there were no two individuals in whom they were identical. The phenomena presented by B. S. and G. R. only, answered to the requirements of a genuine dichromatic xanthokyanopsia. Next to them came A. S., who recognized a pronounced red tone as such; he also differented green from yellow and called it reddish. The two brothers B. S. and A. S. agreed very well together, and differed from all the others by designating purple, with its transition into violet, as black. The specific sensation which these colors called forth in the two brothers must, therefore, be reckoned as a minimum or none at all.

Like A. S., R., O. and K. distinguished red and green from yellow; recognized the red correctly; the green as red or brownish. O. was the only one who called violet by its proper name.

O. R. did not confuse red and green with yellow, but called both green.

W. distinguished the shades (1–13) most easily confounded with yellow, and also carmine (27–30) correctly; on the other hand, the transition of the grass-green into the blue-green, which corresponds in some degree to the neutral band in the spectrum, was not distinguished.

St. saw, as he did in the spectrum, red, yellow, green and blue.

Z., when examined by this method alone, could not be considered as color-blind.

While it must be admitted that the color-nomenclature of the color-blind does not always correspond with their color-sensation, nevertheless there is an undoubted parallelism between the naming of the pigment colors and the matching of the spectral colors.

When I asked, with Mauthner, what two colors were con-

tained in the index, H. and St., while examining carefully as in the spectrum examination, regarded the question as superfluous and hardly in earnest, and protested strongly against the proposition that they should see only two colors. The division into red- and green-blindness, based on the shortening of the right end of the spectrum and the relative brightness of the various parts, does not find any corroboration in these observations. On the contrary, they show that the red-and green-blind make the same kind of mistakes however great the personal variations may be.

Here also, as in the examination with the spectral colors, we cannot successfully explain the differences in the condition of the color-blind, simply by mistaking the intensity of light for color.

SIMULTANEOUS CONTRAST.

a. Colored shadows.

In order to do away with a possible source of error, I used, in the first place, instead of colored glasses, colored solutions, chloride of nickel combined with chromate of potash, fuchsin, etc. But the very much reduced intensity of the monochromatic light, when using thick layers of these solutions, caused me finally to adopt the pure spectral colors. I am greatly indebted to Prof. Forster, who arranged for me the experiments in the physical laboratory. A solar spectrum of several feet in length was projected on a large white screen, and the desired color was isolated from the others.

As a second source of light I used, at the beginning, a gas flame; later a magnesium light, and finally the electric light produced by means of a Gramm's machine.

In the examination with gas-light, as well as with the electric light, the examinee was directed to select from Radde's chart the colors which to him were identical with the two shadows.

According as the two sources of light, especially the second, were momentarily very brilliant or became dull, the colored shadows became brighter or darker in shade. The

factors with which we had here to deal were: the adaptation of the heliostat, the condition of the carbon in the electric lamp, and particularly the distance of the white screen from the fixed prism and the fixed gas flame.

The observations of the shadows, with the varying intensities of the two sources of light, showed in the majority of cases an interesting result: With an electric light of maximum intensity the shadows, especially the contrast-shadow, disappeared for the color-blind, while for the normal eye they came out with extraordinary clearness and in brilliant shades. On the other hand, for the color-blind the shadows either disappeared or lost their specific character by a certain diminution in the intensity of the light (gas or electric). They said, "I see nothing more," or "I see dimly." At the same time one with normal color-perception saw the color darker in shade, but correctly.

I examined A. S., O., St., R. and K. with spectral and gas-light only, but on two separate occasions. The first time (1) I allowed them to match the colored shadow by colors in Radde's chart, also in the gas-light; the second time (2) the examinee, after having looked well at the colored shadow, went into the next room and matched it from Radde's chart by daylight. Aside from the different illuminations of Radde's chart, the fact that scarcely twice the intensity of the shadow was the same, contributed to make the result far from uniform.

O. R., St., G. R., O. R. Jr., W. and Z., were examined later with the spectral and electric light, G. R. on two occasions.

The *red ground shadow* of the spectral red in the first series of examinations (with spectral light) was matched by A. S. with yellow that contained some green; by O., with orange or yellow; by St., R. and K., with varying reds. The *blue-green contrast shadow* was matched by O. and K. with bluish-green; by R., with red; by A. S. and St., with very dark shades of violet and gray, which both called black.

In the second series (with the spectral and electric light) the *red ground shadow* was matched with yellow by O. R. Sr., and G. R.; with red by O. R. Jr., W. and Z.;

and the *bluish-green contrast shadow* with bluish-green by G. R., W. and Z., by O. R. Sr., with green, which contained a little yellow, and by O. R. Jr., with blue.

The following points are to be specially noted:

R. shows himself peculiar in receiving from the red and green ground shadows as well as the corresponding contrast shadows one and the same impression, since he consistently matches them with red (cinnabar-carmine). He is unexplainable by the ordinary physiological principles.

St. showed a somewhat analogous condition since he matched once the green ground shadow and the purple contrast shadow both with yellowish-green.

K. showed by the first examination this peculiarity, that he matched the red and green ground shadows with the same (cinnabar with a tinge of orange), and the corresponding blue-green and purple contrast shadows with the same (blue-green).

In the first examination St. matched the green ground shadow and the purple contrast shadow with a grayish-black, which arose probably from the fact that at that moment the spectral light was feeble. I have remarked above that by a certain diminution of the light-intensity a number of the color-blind could not distinguish any color at all, while Prof. Foster and myself discerned the colors quite clearly.

A. S., who matched the red ground shadow with yellow, and St., who matched the ground shadow with purple-violet, matched the green contrast shadow with dark or black. O. R. Jr. declared the purple contrast shadow to be colorless, while he matched the green ground shadow with yellow.

The bluish-green contrast shadow was matched with bluish-green by O. K., G. R., W. and Z.; with pure blue by O R., who, very strangely, matched the red ground shadow with red, and not, as we should have expected, with yellow.

The purple contrast shadow was matched with purple or with red by R., O., W., Z., and once by A. S.; with pure blue by G. R.; with greenish-blue by A. S. and G. R.; with violet by O. R.

In direct opposition to the recognized physiological law is the condition of K., who in both examinations matched

the purple contrast shadow with pure yellow, and also the condition of O. R. Sr., who matched the red ground shadow with yellow and the blue-green contrast shadow with yellow-green.

This very great individual difference in the reaction of our ten color-blind to the colored shadows again proves the very great variety in the kinds of color-blindness, and shows also that we are not able as yet to lay down any general laws in regard to the defect, and that there is no genuine reason for the division of the anomaly into red-blindness and green-blindness.

Our results negative the theory that every red-green-blind must see objective green and red as yellow, while green and blue must be classed with the subjective red called forth by contrast.

b. Tissue-paper contrast.

I have lately modified Meyer's tissue-paper method of examination in such a manner that instead of gray paper rings laid on colored grounds, the ground and contrast color to be named or matched, I use letters of gray or black paper laid on colored grounds, and the examinee is required to name the letters seen through the tissue-paper covering them.

Mauthner (see his lectures, p. 249) being of the opinion that every red-green-blind must see green and red as yellow and their contrast shadows as blue, says:

"It is evident that no pseudo-isochromatic method can be generally adopted which is based on the supposition that red and green for the color-blind person are gray, and that consequently, a letter cut from gray paper, placed on a colored surface of a certain brilliancy and covered with tissue-paper cannot be red at all, because it appears to be gray upon gray and veiled by the tissue-paper."

Examinations with colored shadows, however, have shown that not every one of those who, according to the present ideas, are red-blind or green-blind or red-green-blind see the colored shadows as Mauthner indicates they should.

Z., who had a shortening of the red end of the spectrum, saw the spectral red as red and the blue-green contrast shadow as blue-green. R., a pronounced red-green-blind, received from red and green ground shadows and the two contrast shadows the same color-impressions, etc. These observations are in opposition to Mauthner's proposition.

But even if I did not have the experience with the colored shadows no theory can overthrow the facts. Mauthner had at that time made no examinations by my method. As far as I am concerned, however, I have not found in the color-blind that I have lately examined any case that was detected by any one of the other methods which was not also discovered by mine. On the other hand, some who have escaped by one or other of the other methods have been detected by mine.

In my book of colors the following leaves have given me a very positive result in examinations of red-green-blindness; the first (geranium lake, red with a tinge of blue), the second and third (carmine with a little yellow), the fourth (cinnabar), the ninth and tenth (Schweinfurth green). The other leaves are read.

A. S. 1st leaf. 2 tissue papers, not read; 1 tissue paper, dark letters not read.

2d leaf. 2 tissue papers, not; 1 tissue paper, a few bright letters read, which appeared brighter than the other bright letters.

3d leaf. 2 tissue papers and 1 tissue paper, nothing read.

4th leaf. 3 tissue papers and 2 tissue papers, nothing read; 1 tissue paper, dark letters not.

9th leaf. 2 tissue papers, some of the larger, brighter letters were read with difficulty.

10th leaf. 2 tissue papers, some of the larger, brighter letters were made out with difficulty. (Leaves 9 and 10 are not yet made exactly as they should be).

This case and the others examined in the same way yield the following results:

1. That the green tablet is much easier read than the red one, and that it is much less reliable, and is to be used in its present condition only as a verifying method.

2. That each of the examinees committed many errors.

3. That not all red-green-blind regard my table in the same way; some read tests which others cannot, and *vice versa.*

4. That in spite of the variety of mistakes, there is no underlying prevailing peculiarity which can be used as a basis for a division of Daltonians into red-blind and green-blind.

How, now, can we explain the discrepancies between these objective facts and the statements of Mauthner, who, *a priori*, has pronounced against my method? Mauthner holds that these red-green-blind, who, when the gray ring is applied over the color for which they should be blind, easily recognize the contrast shadow (blue), have normal color perception.

I have made similar observations, A. S., for example, who saw in the Heidelberg book the tone of Schweinfurth green (light-green made of arsenic) as yellowish, and the gray letter laid on it and without any covering of tissue paper as bluish.

These phenomena, however, are not very astonishing. The Schweinfurth green contains an amount of yellow, as can be easily seen if a narrow slip of the paper is laid on a black ground and looked at through a prism.

Spectral green is, in fact, seldom seen by the color-blind as such, but as yellow. The confusion color 3 (pale yellow) on the color-table of Holmgren, was matched by many, but, not by all the green-red-blind, with test 1 (pale green).

Nevertheless, neither A. S. nor any of the others were able to make out a letter of gray paper, when laid on Schweinfurth green and covered with two tissue-papers, which are moderately transparent, as mine are. By a normal eye these letters were made out with ease at the distance of 1 metre. By some, the light gray letters of my color-tablet were made out with difficulty when on a green ground, which only proves to me that the proper degree of brightness of the gray has not yet been hit upon.

It must, moreover, not be forgotten that there are among the red-green-blind many whose reaction against the con-

trast colors, is quite different from the typical xanthokyanopes, as we have already seen in the examination with colored shadows. As a further proof, I will add some notes of some experiments I made with some gray and black letters fastened on to a Heidelberg book.

St. did not read the light gray letters on the first leaf (Schweinfurth green) through two tissue-papers, but did through one. Through one tissue-paper, he matched the ground with slate-gray and blue-gray (H 8_a), the light gray letters which to the normal eye appeared bright rose-colored, with H 1 and 2, the black letters (dark purple), with various grays and a dark coffee-brown.

On the fourth paper (a dark, somewhat muddy carmine), he did not read the black letters either through two or one tissue-paper; he, however, read the gray ones. Through one tissue-paper he matched the ground with H 1, 2, 5, and with gray, the bright letters (bright greenish-gray), with H *I*, 3 and 4.

K., like St., did not read the gray letters on the first leaf through two tissue-papers, but read them through one. Through one paper, however, he matched the ground (green) with gray, the gray letters (rose) with pure gray, blue-gray, green-gray, and H 4.

On the fourth leaf K. could read the black letters neither through two nor one paper. Through the single paper he matched the ground with dark-green (H 9_b), the bright letters with H 4.

But the red-green-blind call neither the carmine yellow nor a ring laid on it blue. Very frequently they call a somewhat dark carmine a dark-brown, dark brownish-red, blackish or black. Holmgren 11 and 13 are frequently confused with *II b*, and if a test of dark-red is selected as in my color-book, the confusion color is correspondingly dark, passing over, in fact, to brownish-black.

In Stilling's table, the red tones, which are confused with lighter and darker yellow-browns, are neither very dark nor very pure; they contain a good deal of yellow. As will be seen further on, this table is read by a relatively large number of red-green-blind.

POLARISCOPE.

The polariscope which I used was that of Minder. The quartz plate has a thickness of 6 *mm.* Whilst I formerly used the parallel position of the two Nicols as the zero point, I adopted in these measurations the crossed position as the zero point, because it is easier to distinguish the point of maximal extinction of the rays than the point of maximal brightness.

The examinees were requested to turn the upper Nicol until the two color-fields became of the same color, and the angle was noted.

A. S. at 60° (blue-green, and a color varying from purple to violet) matched with a light blue.

B. S. at 60° matched bright rose.

R. at 42° (green and purple) matched with various greens and reds.

K. at 67° (greenish-blue and flesh-color) matched with gray, grayish-blue, light-blue, rose, flesh-color.

St.* at 54°.

O. at 60°.

G. R. at 40° (yellowish-green and purple and violet) matched with flesh-color, bright brown, rose.

O. R. at 40° matched with *H.* 3 and 4.

W. at 35°.

N.† at 61°.

Z. did not find any two equal color-fields.

It would appear from these observations with Rose's color-measures, that the examinations of the color-blind by means of this instrument, did not furnish the guarantee I had hoped for, since Z., from the beginning to the end, and St., by a later verifying examination, declared that they could

*At a later verifying examination, St. did not find any two equal color-fields.

† N., a pronounced red-green-blind, is here mentioned for the first time in this series of investigations. On account of a severe illness he was prevented from taking part in all the examinations. This is the same N. mentioned by Dr. Minder in his dissertation (p. 33). He was able to detect him only after repeated examinations by the Holmgren method, and then only by the confusion of bright blue with rose. This case was also used by Stilling as a weapon against the Holmgren method.

not find any two similar color-fields. Not without much interest to me is the fact that the two brothers G. R. and O. R. Sr., with great promptness and precision, placed the two similar color-fields at the same angle, while, when examined by Herschberg's double spectroscope, in which the colors appear more saturated, they placed red above red, and not any confusion tint. The following passage from Mauthner,* "Such a spectral apparatus (Hirschberg's) is to be preferred to Rose's color-measurer, which though correct in theory yet leaves much to be desired in its practical application," is quite incomprehensible to me, taken in connection with his thesis and his conclusions.

We shall be compelled to abandon both apparatus in the future examinations of the color-blind, which is to be so much the more regretted because we have in them a mathematical expression for the confusion tints. Should one of the instruments be used, the polariscope would give the more trustworthy results, because the colors are those of a less saturation. The difficulty in the management of Rose's apparatus is more imaginary than real.

It is further manifest that though two pair of brothers had the same angle for equal colors, each pair separately, and all the others had different angles, with the exception of O., who, like the brothers S., had an angle of 60°.

The variety in the phenomena of the red-green-blind shows itself also here to be very great. The size of the angle of the so-called red-blind and green-blind is not characteristic. The results yielded by the polariscope have caused me to abandon the idea of experimenting with Biot's plate, which, with its microscopic stand and the Nicols belonging to it, give the same color-phenomena as the polariscope.

THE SELECTION METHOD.

a.—Holmgren's test.

This method gave, when carried out in exact accordance with the author's instruction, the following results:

* Vorträge [aus ,dem Gesammt Gebiete der Augenheilkunde, etc. Heft IV. p. 188.

	Test I (Green)	Test II (Rose)	Test III (Red)
A. S.	2, 4, IIa.	8–a, bright light-blue.	0.
B. S.	1, 2, 4.	8–a, " "	0.
R.	1, 4, 5, IIa.	Yellow-green, I.	12.
K.	1, 2, 5, various lighter and darker greens.	8, 8–a, 6, 7.	10, 11, 11a, 13b, 13c, 13d.
St.	1, Ia, light gray and light brown.	1. I, 3 shades of violet (7), 9.	IIa, and darker shades of purple, 4, 5.
O.	1, 4, light gray.	8.	12, 13.
W.	1, 2, 4, 5, 8, 9, 12.	4, 5 7.	13.
G. R.	O.	8.	8, 10, 13.
O. R. Sr.	I, 4, 5.	2, 5, 6, 8.	——
Z.	3.	0.	13?
N.	IIb, 1, 2, 4, 5, 8, 9.	Various shades of grayish-blue.	——

In this examination, all of our color-blind made mistakes. Even N. made a series of errors which would class him with the red-green color-blind.

With the most careful examination Z. laid only one confusion tint (3) with test *I a*; to test *II a*, none at all, and to test *II b*, only two shades of reddish-brown. When at the end of the examination I remarked that there were some reds by the brown bundle, he forthwith picked the browns out and laid them to one side. The same thing occurred in connection with the single confusion tint in the first test, when I remarked that a yellow had found its way into the green bundle. This case shows that we are not justified in simplifying the method of Holmgren in accordance with the suggestion of Cohn. On the contrary, we should always use test *II b* in these instances where in test *I a* one or more errors were made, even though none were made in *II b*. If I had followed Holmgren strictly, Z. would have been simply numbered among the incompletely color-blind, whom he does not generally submit to test *II b*. Z. has a shortening of the red end of the spectrum, and is not able to read my tests.

The above observation shows in a remarkable manner what has been asserted by many, and especially by Cohn, that the results of Holmgren's method militate rather against a division of the color-blind into red- and green-blind, and also against the theory of Young-Helmholtz, which Holmgren accepts as the basis of his theory.

According to Holmgren, A. S., B. S., K., St., W., G. R., and O. R. Sr., are green-blind as well as red-blind. Z. was, according to Holmgren, green-blind, and yet, since he had a shortening of the red end of the spectrum, he must be red-blind.

The Holmgren method, however, when carefully carried out with all three tests, is a very reliable one.

b. The wool tables of v. Reuss.

I made, according to the directions of Mauthner (l.c., p. 138), tablets with worsteds according to v. Reuss, and caused the color-blind to match them.

The following were laid together as of the same color:

By A. S.—1, 2, 3, 4, 6, 7, 8, 9, 10, 14, 15, 17, 18, 19, 20.
By B. S.—1, 2, 3, 4, 5, 7, 8, 12, 13, 14, 15, 17, 18, 19, 20.
By W.—1, 2, 3, 4, 5, 6*a*, 7, 8, 13, 15, 19, 20.
By O.—1, 2, 3, 4, 5, 7, 8, 13, 15, 19, 20.
By St.—1, 2, 3, 4, 5, 5*a*, 6, 6*a*, 7, 8, 10, 13, 14, 15, 17, 19, 20.
By R.—1, 2, 3, 4, 5, 5*a*, 6, 6*a*, 7, 8, 11, 12, 13, 16.
By G. R.—1, 2, 3, 4, 7, 8, 14, 15, 17, 19, 20.
By O. R., Sr.—1, 2, 3, 4, 7, 8, 9, 13, 14, 15, 16, 17, 18, 19, 20.
By K.—1, 2, 3, 4, 5*a*, 6*a*, 7, 8, 9, 10, 13, 14, 15, 17, 19, 20.
By Z.—1, 2, 3, 4, 7, 8 (13, 15, 19).

This method, which, according to Mauthner, belongs to the future, proved itself very reliable except in the last case, which is to me the crucial test of the trustworthiness of a method. Z., at first, laid the pseudo-isochromatic 13, 15, and 19, by the isochromatic tablets 1, 2, 3, 4, 7, 8, but on a revision of his work he transferred them to the aniso-chromatic. On questioning he likewise named the whole six colors of these three tablets correctly.

In its present form, v. Reuss's method possesses no advantage over Holmgren's, evidently because it furnishes too restricted a number of shades and tints. If, however, the pseudo-isochromatic tablets were considerably increased in number, it would become as reliable as the Holmgren method, and would have the advantage of a more convenient form. Against certain advantages of colored powders over colored wools, is the much greater richness in shades and tints possessed by the wools.

Among the pseudo-isochromatic tablets of v. Reuss for red-green-blindness, the best—that is, those most constantly seen as isochromatic—are 13 (brown and orange), 15 (blue and violet), 19 (rose and violet), and 20 (bluish-green and bluish-gray). 14 (light green and light brown) and 17 (light blue and rose) were also frequently seen as of the same color.

PSEUDO-ISOCHROMATIC TESTS.

a. Stilling's tables.

I used the last edition of Stilling's tables for the detection of red-green-blindness with letters composed of brighter and darker quadrants on a yellow ground, interwoven with quadrants of lighter and darker brown as confusion tints.

The tables were not read by A. S., B. S., R., St., O. R. and W. Some of the letters, especially H, were made out with difficulty by G. R.

When the tables were held in a somewhat oblique position they were made out with difficulty by K., O. and W.

Z. read them with comparative ease.

These facts condemn at once this method, at least for general use, and throw important light on the value of the results of the examination of 85,996 German railway employees, 30,000 of whom were examined by Stilling's test; at least it explains the 0.62 per cent. of red-green-blindness which was found, so much at variance with former results obtained in other countries as well as in Germany.

b. Cohn's embroidered wool-test.

I used tests constructed by Dr. Minder, which appeared at the time to offer very reliable results. On a closer examination, however, I found that, as with Stilling's table, although some color-blind were not able to read the letters when the table was held straight before them, they made out the letters with greater or less readiness when the table was held obliquely. Some of the letters were not made out under any position of the table, by A. S., B. S., R., K., St., O. and O. R. By holding the table obliquely, some of the letters, which had not been before made out, were distinguished by W., G. R. and N. Z. read the tables with tolerable fluency when they were held straight before him.

c. Color-table of Daae.

In using this test I was at first struck with the uncertainty in the statements of the examinees, which, I think, arises from the fact that to many it is difficult to differentiate between different colors and different shades of the same color. In the examination of those with normal color-perception, it has frequently happened that, in spite of the most painstaking preliminary instruction, all the ten series were declared to be of different colors, and I only obtained a correct result when I asked them directly what color they saw in 8 *A* and what in 8 *F* and *G*, to which they gave correct answers.

For this reason I repeated the examination with this test with the larger number, after the lapse of some weeks. St. I examined four times.

The results were as follows:

1. Many of the examinees gave different results at the different examinations.
2. R. and Z. are not color-blind.
3. Pure so-called green-blindness was not demonstrated.
4. Pure so-called red-blindness was demonstrated in W., G. R., and O. R., and finally also in K.
5. The confusion characteristic of green-blindness and

red-blindness was made by A. S., B. S., O., St., and finally by K.

We will not discuss in this place the justness of the 2d, 3d and 4th of the above conclusions.

REACTION TO HOMOGENEOUS LIGHT.

I first employed Stilling's tables with red, green, blue, and yellowish-blue letters on a black ground, which were read by a normal eye at 200′–20′. As measured by these tables:

A. S.	had	V	for	red	= ½
"	"	"	"	green	greater than 1
B. S.	"	"	"	red	= ½ to ⅔
"	"	"	"	green	= ½
St.	"	"	"	red	= 1
"	"	"	"	green	= 1
K.	"	"	"	red	= 1
"	"	"	"	green	= 1
O.	"	"	"	red	= 1
"	"	"	"	green	= 1
R.	"	"	"	red	= 1
"	"	"	"	green	= 1

Later I endeavored to determine the reaction to homogeneous light by means of Rose's color-measurer. As is well known, the brightness of the two color-fields in this apparatus can be varied at will by turning the lower Nicol. When the Nicol is in such a position that its plane of polarization and the principal plane of the rock crystal coincide, one of the fields disappears, while the other attains its maximum of brightness.

In examining with this method, I adapted the apparatus so that the color for the perception of which we were in search was invisible, and then instructed the examinee to turn the lower Nicol to one side, but only far enough to expose the color-field; the Nicol was then to be turned back until the color-field again disappeared, and still further, until the color was once more visible on the other side.

If the whole angle from the farthest position on the right

to the farthest on the left is divided by two we have the desired size. It can be called the angle of disappearance or the angle of appearance.

In a medium diffuse daylight the angle of disappearance is, for the normal eye, so small as to be scarcely discernible; for certain colors it is *nil.* In order, therefore, to obtain a larger angle, and at the same time to have comparable measurements, I placed a case above the upper Nicol, in which I could insert any desired number of smoked glasses, and employed, as a constant source of light, a candle at 0.5 *m.* distance.

I examined all the color-blind as regards the perception of both colors, which were indicated as similar.

Since this apparatus has never, so far as I know, been employed for this purpose, I will not weary the reader by giving any tables, but only state the results. In the adaptation of the instrument I noted two periods: 1, when there was a perception of light in the color-field; 2, when some color was clearly distinguished.

In the first period, where there is simply perception of light, I did not discover that there was any smaller angle than in normal eyes. The second angle, which gives the time when a color can be clearly made out, is much larger and is more than double that of normal eyes.

This corresponds with the observations made with colored shadows. These disappeared, or were much diminished in intensity, when their brightness passed a certain limit, while they were still seen with great distinctness by the normal eye.

It is possible, however, that we shall obtain more important results by the examination of the reaction against homogeneous light in cases of acquired color-blindness, than has yet been found with the congenitally color-blind. It is well known that certain nerve troubles, in their earlier stages, with almost normal vision and central perception of red and green, show a contraction of the visual field for these colors. It is, therefore, a justifiable supposition that the central reaction for red and green has begun to suffer at a time when the ordinary photometers do not show any essential diminu-

tion of light-perception. It is on this account most desirable to have some means for a clinical examination of the central perception of homogeneous light. Future investigation will show how far this method can be made applicable for this purpose.

Taken with the results furnished by the perimeter, a demonstrated diminution of the central perception of homogeneous light would in many cases render an otherwise doubtful diagnosis of beginning nerve trouble certain. Furthermore, the diagnosis of a combination of color-blindness and commencing nerve trouble would receive further support, for the first measured angle, which marks the beginning of light-perception, and which is the same in the color-blind as in the normal eye, is much larger in a commencing nerve trouble.

COLOR VISUAL FIELD.

(*Figs.* 1–5.)

The peripheral color-perception was examined in five of our color-blind. For this purpose I used a Schenk's perimeter and Heidelberg papers 2 *cm.* in size. The centre of the half-circle was used as the point of fixation, and the examination was conducted under good illumination.

The color-lines* circumscribe the field in which there was a specific impression of color, and the color was called by its proper name, or red and green were confounded with yellow or a color not identified as yellow.

In four of the color-fields (Figs. 1, 2, 4, and 5) the limit for yellow exceeded that for blue. A. S. (Fig. 3) alone perceived the blue more peripherally than the yellow, as is the case with normal eyes.

In R. (Fig. 1) and K. (Fig. 4) the yellow line passed beyond the white in places. The blue limit is very much reduced in W. (Fig. 5), in whom it almost coincides with the red and green, and the same is true in a less degree in K. (Fig. 4), and in A. S. (Fig. 3).

The limit for yellow is much less than in the normal eye

*———green,— — —red,— · ·—blue, . . . yellow, - - - white.

in A. S. (Fig. 3) and W. (Fig. 5), and also less than in the other three color-blind.

The red and green limits coincide in R. (Fig. 1), and almost coincide in O. (Fig. 2), without being reduced; on the contrary, they appear to be extended. Whilst R. could not distinguish the one color from the other (though not recognizing them as yellow), O. always called them by their proper names. K. and W. distinguish the red more peripherally than green, while the opposite was the case with A. S.

The visual field in these three gentlemen is contracted, and that for green in K. and W. Red was by them distinguished as red; green by A. S. and W. as yellow, and by K. as gray.

Supplementary to the above, I will make mention of a color-blind person whose color-field I measured (Figs. 6 and 7), and the classification of which is by no means easy.

A. Peçon, 41 years old, a watchmaker, presented himself at the clinic, complaining of an amblyopia, which had rapidly increased during the last year.

Since, from the conduct of the patient, we had reason for supposing we had to do with an amblyopia—probably toxic—he was examined with the perimeter, and the remarkable contraction of the visual field, for white as well as for colors, strengthened us in the probable diagnosis.

Examination with glasses showed perfect visual power after correction of the manifest H of I D; before correction, V=¼, ophthalmoscope, *nil.*

Nevertheless, Peçon named correctly all the colors on the perimeter. We have here, then, only a case of anomalous color-perception. The short time the patient was under observation allowed of an examination only by v. Reuss' wool test and my color-table.

The first examination was interesting, from the fact that he classed No. 15 (blue and violet) as homogeneous. He, at first, classed No. 20 (blue-green and blue-gray) among the homogeneous, but afterward put it among the heterogeneous class.

I now took some of the heterogeneous tablets and asked

the names of the colors. The anomalous color-perception was then clearly manifest. In No. 9 he called red, yellow and brown; in No. 11 red, yellow; and green, black, etc.

In my color-book—with his correction glass—he made all the mistakes of a high degree of red-green-blindness; moreover, he read nothing on orange ground through two tissue-papers, nor in the violet through one.

The visual field for all colors, as well as for white, was very much contracted. The limit in both eyes for red was remarkable, since it fell inside of that for green. To the inner side in the right eye the red limit passed a little outside of the green.

The limits for blue and yellow, though contracted, are relatively less so than for red and green.

In some directions in the right eye, the blue was perceived further toward the periphery than the white.

From these examinations it will be seen that we have here a total want of the red-and green-perception, and a partial defect in the yellow-blue-perception, though this was not demonstrated by v. Reuss' test. An eye that is normal for yellow and blue should read the orange and violet.

In what category should this case be placed, according to the Young-Helmholtz theory? Is it red-blindness, green-blindness, or total color-blindness? The inability to read violet would seem to argue in favor of an anomaly of violet-perception, and of the red-and green-perceiving elements one at least must be lacking or perform its function abnormally; the case, therefore, would fall under the head of total color-blindness. It can hardly be otherwise considered than as a case of red-green-blindness, combined with partial yellow-and blue-blindness.

Subsequently I examined the brothers A. S. and B. S., and Messrs. O., K. and R., after hypnotization of the eyes by the laying on of the warm hand. But in none was there the least alteration in the color-perception.

As regards the questions with the solution of which I charged myself in my investigations, I think I have thrown some light on the first, namely, the relative value of the different methods for examining for color-blindness. For

this, in order to avoid repetition, I would refer the reader to the observations I have recorded.

The observations made on color-blind people have thus far not yet led to a forcible conclusion in regard to the correctness of the one or other theory of color-perception, though, during the last years, the experiments have been as objective as possible, the nomenclature—at variance with what E. Brücke* still seems to suppose—being considered of secondary importance.

The Young-Helmholtz theory has, through recent modifications, especially that of Fick, become capable of explaining many phenomena which were not explicable before. To this end, however, we must accept, with Brücke, a large number of alterations in the functional activity of the individual color-perceiving elements in one and the same place of the retinas of different individuals, and in various parts of the retina of the same individual, a great variation in the reaction of these elements to light of different wavelengths, etc., which would make the simple and lucid theory a very complicated one, and the hypothesis very elastic.

To me the most significant fact against this theory is the circumstance that the division of color-blindness into red-, green- and violet-blindness cannot be consistently carried out. This theory lays great stress on some not very precise reactions of the color-blind which are in opposition with the spectrum, and very many other phenomena cannot, without coercion, be made to agree with this division.

The relation of the red-blind and the green-blind to violet runs counter to many of the other phenomena of the theory, if violet is to be taken as the third fundamental color.

The first appearance of the diminished chromatic sense is found, according to Donders, in the confusion of blue and violet. The shortening of the violet end of the weak spectrum is, in these cases, to me quite incomprehensible.

The larger angle in Rose's color-measurer, as well as the quicker disappearance of the specific impression of colored shadows for the color-blind, can be explained by the

* "On some Consequences of the Young-Helmholtz Theory," p. 55.

Young-Helmholtz theory, if we accept with Brücke (l.c., p. 23) that in the color-blind the scale of colors at the centre runs downward to blackish and black, and upward to whitish and white, much more rapidly than in the normal eye; that, in fact, we have about the same condition as at the periphery of the normal eye.

Whether the theory of Hering, as modified by Mauthner, is to be fully accepted, is still an open question; it will probably not be so incomprehensible for every one as for Fick.*

Many phenomena are more easily explained by it than by the first-mentioned theory.†

But is it not possible that the two theories can be brought into more intimate relations? It would be bold, indeed, to leap with a *salto mortale* over the doctrine of the specific energies of the nerves of special sense, and on the other hand the adherents to the Young-Helmholtz theory believe that the visual impressions, in all probability, are brought about by chemical processes.

Brücke (l. c., p. 5) says: "It is difficult for us to imagine a repeated change from negative to positive after images, except we suppose that by means of the circulatory current there is a regeneration, in consequence of which, when it has reached a certain point, the original process again begins and continues until a new exhaustion makes a new regeneration necessary."

In accordance with this—provided that chemical processes, very complicated in their nature, bring about the act of vision, and according to their different qualities excite the nervous elements of the retina differently—the further discussion of the question would very naturally concentrate itself on which of the two divisions of nerve fibres, the Young-Helmholtz (red, green and violet), or the Hering (white-black, red-green and blue-yellow), is the more capable of explaining normal perception of colors as well as the phenomena of color-blindness.

* Hermann, Physiologie, Bd. iii, p. 205.

† Max Pischel concludes in his work, "Experimental Examinations on the Adaptation of the Retina to Colors" (Pflüger's Archives, Bd. xxi, p. 405–430), that neither of the two theories coincide with his results; but he considers the Hering theory only in its first form, in which the red-green and blue-yellow substances are assumed to be independent of each other.

Instead of the varying functional activity and adaptation of the terminal apparatus in the different parts of the retina in the same individual, and in analogous parts of the retina of different individuals, we can accept a quantitative and qualitative gradation in the chemical processes.

The very great variety in the cases of red-green-blindness, almost as great as the number of cases, a circumstance to which Rose called attention,* could be explained by the great number of gradations in the chemical processes. I can thus explain those cases which hitherto have been classed as red-blindness resp., red-green-blindness, and in which there was a specific impression of red, and which was not confounded with a shade of yellow.

The histories of these cases prove again the propriety of the terms which have been often misapplied. The term "color-blindness" should not be discarded. The terms "red-green-blindness" and "yellow-blue-blindness" can, I think, be very properly retained, without reference to any particular color-theory, solely with regard to the color-confusions which the color-blind make. The color-blind with a shortened red end of the spectrum can be designated as "red-green-blind," while those with a spectrum of normal length can be called "green-red-blind."

* *Archiv f. Oph.*, B. vii, No. 2, p. 88.

SUBPERIOSTEAL ENUCLEATION OF AN IVORY EXOSTOSIS OF THE FRONTAL SINUS, EXTENDING INTO THE NASAL AND ORBITAL CAVITIES. HEALING BY FIRST INTENTION.

By H. KNAPP.

THE osseous growths which intrude into the orbit from the neighboring cavities, are rare and little known. Without at this place entering into their bibliography, the following observation seems of sufficient intrinsic interest to deserve publication.

In June, 1880, a gentleman of about 48 years of age, whom I had known for many years to be a healthy and active man, free from any constitutional taint, came to see me on account of a slight drooping of his right upper eyelid, noticed by others more than by himself, and causing no inconvenience whatever. I found the inner part of the upper lid slightly prominent and pushed down. Conjunctiva and eyeball normal; mobility unimpeded; vision and ophthalmoscopic condition normal.

In the inner-upper corner of the orbit there was a tumor, nearly as large as a flattened hazel-nut, slightly uneven, abruptly rising from the orbital wall, and in immovable connection with it. Its periphery had a hard, bony feel; its apex appeared somewhat yielding. The patient's right nostril had been frequently stopped up and discharged greenish scabs, but did not, at this time, show any abnormity. My diagnosis was uncertain between a dilatation of the frontal sinus by a retention cyst or polypoid growths, an orbital exostosis and a peri-orbital sarcoma with osseous spicula.

During the next four weeks, the tumor did not seem to grow appreciably, but when I returned from a summer vacation, early in

September, I found it decidedly increased, being no longer confined to the upper-inner corner of the orbit, but reaching down a few millimetres below the ligamentum canthi internum. I advised the patient to have it removed without much delay, since a further increase would necessitate the division of the ligamentum canthi, and interfere with the motions of the lids after the removal of the growth. The tumor then had the size of a flattened walnut, did not impede the movements of the eyeball, but pushed the globe slightly toward the temple. Sight and ophthalmoscopic condition normal.

September 14, 1880. With the kind help of Drs. Geo. A. Peters and Robert F. Weir, and two of my assistants, Drs. R. O. Born and W. C. Ayres, I performed the operation in the following manner:

The patient being etherized, I made a curved incision from the middle of the superciliary arch along the lower margin of the brow, down to the insertion of the inner canthal ligament. Cutting in the centre of the incision at once down to the bony basis of the tumor, the stretched periosteum parted on being divided, and exhibited the yellowish-shining surface of the tumor, the uniform hardness of which along the whole line of incision, at once revealed the character of an ivory exostosis. After incising the periosteum around the basis of the tumor, close to the orbital wall, as far as it could be reached, I detached it from the growth with a small hand-chisel. The bony tumor showing a slight constriction at its basis, gave the impression of an exostosis united to the orbital wall by a broad basis of more or less cancellous tissue, such as is common in ivory exostosis of the orbit.

With a chisel and hammer, I cut a furrow along the supposed cancellous base of the tumor, and, as the bony mass did not become loose or movable in any way, I chiselled a regular groove into it, 10 *mm.* deep and 25 *mm.* long, along the wall of the orbit. Gentle but persistent chiselling for about three-quarters of an hour made it evident that I was not reaching the supposed cancellous base, but was carving a furrow into the uniformly compact mass of the tumor itself, just as I had done in another case described in Graefe's *Archives*, vol. viii, p. 239, *et seq.*, and it was clear to my mind that the tumor, as in the case referred to, extended beyond the limits of the orbit into the nasal fossæ, the frontal sinus, and, perhaps, the cranial cavity. Being all around

in connection with the bony wall of the orbit, it seemed that it had, as in the above-mentioned case and some others recorded in literature, originated in the diploë, and developed on both sides of the bone. To desist from the operation, as has been done in some such cases, would have delivered the patient to an uncertain, but surely to an unhappy life.

I, therefore, unhesitatingly decided to break down the osseous surroundings of the tumor, and, if possible, shell it out within its periosteal covering. This was accomplished in the following way:

The edge of the chisel, instead of being directed toward the tumor as before, was now held perpendicularly to the wall of the orbit which enclosed the tumor. Being softer bone, it was easily penetrated by the chisel. I began to do this at the upper edge of the tumor, close behind the supra-orbital notch, carefully avoiding any interference with the pulley of the superior oblique muscle. I then proceeded along the circumference of the tumor, breaking down the bony plate of the orbit as far as it encased the growth, Having done this from the superciliary notch along the upper-inner corner of the orbit down to the middle of the anterior part of the os planum, the osseous tumor became loose, and the possibility of its removal *in toto* was demonstrated. The problem now before us was to remove it without injury to the neighboring parts, especially the eye. Bearing this object in mind I endeavored to detach with the hand chisel by means of careful carving all the soft parts from the tumor, always directing the edge ot the chisel toward the bone. When in this way I had freed the anterior orbital and nasal surfaces of the tumor, it would probably have been possible to pry it out. But fearing to lacerate the soft parts, with which the tumor was still connected at its posterior surface, I turned it with bone forceps on its vertical axis so that its posterior suface looked toward the septum of the nose, and with the hand chisel I freed also the posterior surface from all its soft parts. After doing the same on the upper and lower surfaces the whole tumor lay completely loose in its periosteal envelope, and was drawn out with bone forceps without a fibre being cut or torn. It was thus virtually shelled out.

On examining the wound with the finger, the upper half of the os planum and the whole anterior upper-inner half of the roof of the orbit were absent; the upper part of the nasal cavity and the

whole right frontal sinus lay open, and in the outer part of the roof of the orbit a triangular piece of bone was fractured and freely movable. This triangular piece turned its base, of about one centimetre in length, free and ragged toward the open frontal sinus, and its apex toward the temple. Its height was also about one centimetre. It lay behind and laterally from the supra-orbital notch. Though movable up and down, it was kept in its natural position by the periosteum and dura mater. Trusting that the fracture would heal without difficulty, I did not remove this piece of bone. The fracture evidently occurred during the hammering, or by the turning of the tumor with the bone forceps, for I did not sever this part of the encasing bony wall of the tumor with the chisel for fear of injuring the superior oblique muscle and condemning the patient for life to the misery of diplopia.

When by digital examination the dilated frontal sinus and the opened nasal cavity were found free from other growths, and when some bruised soft parts over the ligamentum canthi interni had been cut away with the scissors, and the insignificant bleeding had completely ceased, the wound was united by silk sutures, the threads being passed through the skin and periosteum on both sides. The cavity of the wound was thus shut off from the orbit. At the lower end of the wound, immediately above the ligamentum canthi, a silver drainage tube, with several perforations in its walls and provided with a flange at its outer end, was inserted, and a charpie-flannel bandage applied.

The whole operation lasted an hour and a half, during which time the patient was kept under ether. Only once he groaned from pain, and that was when, in freeing the tumor from its connection with the roof of the orbit, I had struck the frontal nerve with the chisel.

When the patient came to he could move his eye freely in every direction, saw well with it, and had no diplopia, but the right side of his forehead was numb.

He passed a quiet night.

The next morning the lint was found soaked with bloody liquid which had oozed out through the canula. There was very little swelling of the lid. In the evening the lint and eyelid were in the same condition. The drainage canula was removed and another one inserted as had been done in the morning. The patient felt easy, but tired.

The third day his condition and that of the wound was the same

The fourth day the secretion from the tube was so scant and the whole wound so well united and free from any reaction that the drainage tube was left off. The whole region of the wound, including the frontal and supra-orbital regions, were slightly swollen, but neither red nor painful.

On the fifth day I removed the sutures, for the union was firm, and no inflammation had set in. During the first days some clots of blood had passed through the nose. In the whole first week the patient felt free from pain, had no fever, his appetite and sleep were good, but he showed symptoms of fatigue, slept at times during the day, and was tired by slight mental efforts, even short conversations. Though he was greatly pleased with the result of the operation, he disliked to hear it mentioned.

In the second week the swelling in the region of the wound was subsiding, but the patient felt chilly and his complexion assumed a distinctly yellow tint, though there was no fever nor any other unpleasant symptoms. Apart from the sanguinolent oozing in the first two days, there had never been any discharge from the wound. Knowing from my experience with diseases of the mastoid process that symptoms of pyæmia are not at all infrequent after wounds of bones, but in the great majority of cases disappear without serious disturbance, I was not at all alarmed at the patient's jaundice and his low degree of prostration and chills. I ordered him 20 centigrams. of quinine three times daily, which, he assured me, had a very good effect, making him at once feel better and stronger. His yellow complexion disappeared in a week. The recovery was steady and regular. He kept his bed the first five days, was up the whole day from the tenth day, and went out for the first time on the fourteenth. In the fourth week he began to resume his work, but it took him six weeks till he had fully recovered his previous strength and energy. When I saw him last, November 14th, his complexion was perfectly healthy, the region of the wound could scarcely be distinguished from the other side, the frontal region had recovered its sensibility, and the patient said he felt as well as ever.

The tumor removed is completely free from periosteum, and apparently consists of compact bone substance throughout. It is oval, the size of a large English walnut (see figures on next page). Its vertical diameter measures 36 *mm.*, its greatest antero-posterior (sagittal)

diameter (Fig. 2) 29 *mm.*, its greatest lateral (frontal) diameter 24 *mm.* Its surface is uneven, with several nodular projections. The nasal (medial) surface is the longest, somewhat flattened, and shows near its upper part a rough place, 18 *mm.* long in the sagittal direction, and 9 *mm.* high. With

Fig. 1, nasal Fig. 2, anterior Fig. 3, orbital
SURFACES OF TUMOR. NATURAL SIZES.

this rough surface the tumor had evidently adhered to the septum of the frontal sinus. The bulk of the tumor, about two-thirds, lay in the frontal and nasal cavities, whereas one-third projected into the orbit. The demarcation line between the extra-orbital and intra-orbital portions is indicated by a slight smooth furrow. It is possible that the tumor originated in the orbital wall and grew in both directions, but it is more probable that it started from the septum of the frontal sinus, and grew into the nasal and orbital cavities, piercing the wall of the orbit. I think the rough surface mentioned above was the basis of the growth, for it looks exactly as I have seen it in purely orbital exostosis.

The operation, for me, was highly instructive and suggestive. Easy as it is to remove orbital exostoses which project in the orbit only, the case under observation shows that the difficulties connected with those osteomas that are both orbital and extra-orbital, may also be overcome. In future I shall not shrink from the attempt to remove any exostosis, even though it project into the cranial cavity with a considerable mass, as in the case mentioned above, in which I

desisted from the operation, and the patient died 11 weeks later from meningitis. The method of shelling the tumor out within its periosteal envelope, followed in the case under consideration, and which, in the heading of this paper, I have called "subperiosteal enucleation," seems to be applicable to all of these tumors. Being covered on all sides with a thick layer of periosteum, they can, even when protruding into the cranial cavity, be shelled out without piercing the dura mater.

The recovery in the case under consideration was as smooth as could be imagined. There was the reaction from a protracted and somewhat extensive operation on the general system and in the region of the wound. The hammering at the skull may have produced some concussion of the brain with transient changes in its substance such as I have seen and described in the retina*, accounting for the patient's mental fatigue in the first 10 days. The slight swelling in the region of the wound was not of an inflammatory character, but simply connected with the disturbance of circulation in the process of repair. Not a drop of pus was discharged, though the modern antiseptic precautions were disregarded both during the operation and in the dressing. In operations on the eye and its surroundings, I firmly believe that suppuration, or inflammation in general, is best avoided by sharp and clean instruments, clean hands, sponges and dressing material, by cutting without bruising, and keeping foreign substances out of the wound, save a drainage-tube in case the sanguinolent and parenchymatous secretion in the first days after the operation collects in a larger cavity; for instance, after the removal of orbital or supra-orbital tumors. In eye surgery, I have not been able to convince myself of the usefulness of any of the antiseptic substances and methods now in vogue, and should not be surprised to see them, at an early day, abandoned as superfluous, in spite of their present popularity.

* This volume, p. 297, etc.

SUCCESSFUL REMOVAL OF AN ORBITAL EXOSTOSIS.

By H. B. SANDS, M.D.,

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C. H., æt. 22, a healthy-looking farmer, entered the New York Hospital, March 25, 1880. Three years before admission he noticed a slight protrusion of his right eye, accompanied with deep-seated orbital pain, headache, and vertigo. Since that time the protrusion had gradually increased, and the right nasal passage had become obstructed. No impairment of vision.

When admitted, the patient could hardly close the lid over the right eye, the protrusion of which was very marked, and was apparently due to the presence of a firm, smooth growth springing from the floor of the orbit. The tumor was immovable and ill-defined, as if deep-seated, and covered by the orbital tissues. The right nasal fossa was obstructed, so that it would not allow the passage of a probe; but the nature of the obstruction was not discovered until the time of the operation, when a somewhat firm mucous polypus was found, having no connection with the orbital tumor. The latter, however, seemed to have caused some narrowing of the nasal passage, the sides of which were closely approximated. No positive diagnosis was made, although the coincidence of exophthalmos with nasal obstruction led to the suspicion that the tumor was connected with the antrum.

Ether having been administered, a triangular flap, having its apex near the inner canthus, was reflected so as to expose the anterior wall of the antrum. This was cut away sufficiently to admit the finger, when it was ascertained that the cavity was empty. The eyeball being now protruded and pressed upward, the inferior edge

of the orbit was gradually removed until the index finger could penetrate the orbit deeply enough to feel the morbid growth. This was found to be a hard, roundish body, a little larger than a hazel-nut, attached to the superior maxillary bone, far back in the orbit, close to the spheno-maxillary fissure. By the use of a chisel and an elevator it was removed, bringing with it a portion of the floor of the orbit. A horse-hair drain was introduced into the wound, which was closed with sutures. After the operation the patient did well, and left the hospital at the end of a fortnight, at which time the wound was healed, except along a narrow fistulous tract, leading to its deepest part. The protrusion of the eyeball had almost entirely disappeared, and vision remained unaffected.

An examination of the tumor showed it to consist of a shell of compact bony tissue, containing a large nucleus of cartilage.

A CASE OF PERSISTENT HYALOID CANAL AND ARTERY.

By Dr. E. J. GARDINER, of Chicago, Ill.,

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(*One wood-cut.*)

THE small number of cases of persistent hyaloid artery and canal reported justifies, I think, the publication of the following one, for which I am indebted to Dr. H. C. Hotz, who placed the patient under my care:

T. N., age 22, American, presented himself at the Illinois Charitable Eye and Ear Infirmary, complaining of dimness of sight. On first ophthalmoscopic examination (without atropine) the following condition was found: Cornea and iris normal (both eyes). *L. E.*, floating opacities in vitreous. *R. E.*, a grayish-white reflex was seen, which suggested the idea of a detachment of the retina in folds. Atropine was instilled, and with fully-dilated pupils, the following interesting condition presented itself: *R. E.*, extending from the papilla forward to the posterior capsule of the lens, is a white-shining cord of about the calibre of one of the principal branches of the retinal artery. At its insertion into the optic nerve it forms a funnel-shaped expansion, entirely covering the papilla and its vessels, and extending a little beyond it, at the nasal side. The anterior portion forms a similar funnel, only much smaller, and is attached to the posterior capsule of the lens. This cord, examined in the upright image, exhibited rhythmical movements, and was found to consist of a bright red blood-vessel enveloped in a thin translucent sheath, which I believe to be Cloquet's canal. The expansion at the posterior capsule, when examined through

the ophthalmoscope with a strong convex lens, is seen to consist of numerous little blood-vessels, spreading and ramifying over the posterior polar region of the capsule, in a way very similar to the distribution of the blood-vessels of the placenta (*See Fig.*). The details of the fundus cannot be made out very well, the vitreous being somewhat hazy. In the *L. E.* no trace of the anomaly was discovered. I did not test his sight before the instillation of atropine, but under its effects V=R E $\frac{20}{200}$; L E $\frac{15}{200}$ improved by +12 to $\frac{20}{40}$.

Appearance of the ramification of blood-vessels over the posterior capsule of the lens.

Although I have carefully searched the literature at my disposal, nowhere have I found reported a case where persistence of both Cloquet's canal and the hyaloid artery was found, or the ramification over the capsule was observed. There are a few cases on record where small remnants of the artery were seen attached to the optic nerve, the anterior portion floating in the vitreous. De Wecker* observed, in an eye with upward dislocation of the lens, the atrophied artery extending from the papilla forward and upward into a white substance which surrounded the lens. The same author, in his "Traité des Maladies des Yeux," page 48, describes an interesting case of persistent canal of Cloquet terminating in the figure of an S at the posterior capsule of the lens, but in neither case is a ramification of blood-vessels over the lens mentioned.

* *Annales a 'Oculistique*, Vol. LIII.

THE TREATMENT OF OPHTHALMIA PURULENTA GONORRHOICA AND NEONATORUM, WITH CLINICAL REPORTS.

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GONORRHŒAL ophthalmia is recognized as one of the most dangerous and virulent diseases of the eye.

Purulent ophthalmia may be regarded as a more severe form of catarrhal ophthalmia, in which all the symptoms of the affection are intensified in degree. Ophthalmia neonati, strictly speaking, cannot be recognized as a special form, for it either assumes the form of purulent or catarrhal ophthalmia. It would be out of place for me to attempt to elaborate upon the differential diagnosis.

My only apology for an article on this subject is the great and universal want of a line of treatment more rational, and that affords a greater percentage of cures than usually obtains, as recorded in the printed literature and in general and special ophthalmic practice. I can only offer as a commentary on the present general plan of treatment, whether the end sought is abortive or curative, to say, throw scarification, leeching and iced compresses to the four winds; they destroy five eyes where they save one. After the disease is clearly defined, so that there need be no error in diagnosis, I claim that we can promise the patients the preservation of all the sight they come to us with; and if the patient is seen at the very outset of the

disease, the trouble can be effectually aborted and cut short at pleasure, thus producing a speedy convalescence and cure. I look upon these terrible disorders with as much complacency as I do on a simple case of acute catarrhal ophthalmia. The principal points in the treatment, as outlined in the literature of the subject, I adhere to, such as maintaining the most scrupulous attention to cleanliness of cornea and oc. and palp. conjunctivæ, regulating the diet and habits of the patient, with perfect rest and repose of mind and body.

The prescription I have learned to rely upon as almost a specific to the virus, is as follows:

℞

Morphiæ sul., gr. 3–5.
Zinci chloridi, gr. 2–6.
Aquæ rosæ, gtt. x.
Aquæ dest., ℥ i. ℿ

In the case of ophthalmia neonatorum the remedy should be much weaker. I might incidentally remark that I have found this combination of equal importance in gon. urethritis, without the internal administration of any remedies whatever, excepting in the case of general debility. In many cases there was no discharge after the first injection. Patients tolerate this injection as they would so much water.

Case 1.—Mr. S. E. D., æt. 22, farmer.

History.—Contracted gon. urethritis two weeks previous.

Status Præsens.—Oculi conjunctiva piled up over cornea until only a small portion of centre could be seen; palp. and oc. conjunctivæ terribly swollen and œdematous. Photopobia and lachrimation, ciliary and temporal pain.

Diagnosis.—Gon. oph. *R. E.*, two days.

Prognosis.—Very unfavorable.

Treatment.—Scarified palp. and oc. conjunctivæ; leeches to the temple. Applied a forty gr. sol. argent. nitrat., followed by iced compress. Reaction was severe, with an increase of pain and œdema. Failed to abort the trouble, but followed out the

best treatment on record, and fought the disease, inch by inch, for three days and nights. At this time the eye presented the following condition: Discharge continued purulent and copious. The cornea, what I could see of it, became opaque, and a central abscess seemed imminent. I felt that a crisis had been reached in this case, and that in the course of another twenty-four hours the cornea would give way.

We at once removed the iced compress, cleansed the lids thoroughly, instilled the atropia drops, applied the zinc and morphia sol. Patient rested well all night, and in the morning the appearance of the eye was much better, and after two more applications all the cornea was visible and less cloudy. This treatment was continued for four days longer, when the mother of the patient was instructed how to carry out the treatment, and they took the train for home. I saw the case two weeks afterward, and it was a difficult matter to distinguish which had been the affected eye.

CASE 2.—Miss E. F., servant, æt. 18.

History.—Gon. vaginæ, ten days.

Status Præsens.—Large abscess left cornea, *central;* great œdema of palp. and oc. conjunctivæ. Iris not visible; all the other symptoms of a severe attack present.

Diagnosis.—Gon. oph. *L. E.*, five days. Patient disputed the diagnosis, but finally admitted the exposure.

Prognosis.—Very unfavorable. I could only hope in this case to get a passable result.

The plan of treatment was indicated to me by my experience as related in the first case, and at the end of five days' care discharged the case, with eye in the following condition: Tn.; abscess had left scarcely any cicatrix; anterior chamber shallow, with a partial synech. ant. The adhesions gave way from cornea by use of sul. atropiæ, and there is a splendid chance for an iridectomy.

CASE 3.—Infant of C. McG., æt. 3 weeks.

History.—Eyes commenced to inflame when babe was three days old. Physician in attendance failed to recognize the trouble. An allopath was in attendance at the birth, but a homœopath was called in to attend the eyes. I was employed after the disease had been in full blast for eighteen days.

Condition.—Both corneas perforated in centre, and had a consistence and appearance of coagulated albumen; copious greenish-yellow discharge: great œdema of lids and oc. conjunctiva.

Prognosis.—All I could offer was an attempt to relieve the suffering of the infant and try and stop or correct the discharge.

Treatment.—Warm applications, oft-repeated cleansings, instillation of weak sol. sul. atropiæ, everting the lids and gently flowing over the conjunctiva; the sol. as named in the ℞ mentioned. At the end of four days' care and ten applications the globes were plainly visible and movable. The abscess of corneas had entirely healed; atropia drops had prevented any synechiæ. The iris, after the discontinuance of atropia, responded to light. I discharged the case, and had every hope that the dense corneal leucomas would ultimately, in a great measure, clear up; and now, after the lapse of near three years *S* is tolerably good. There is strabismus convergens and some nystagmus, caused by interference in the refraction, produced by the resultant atrophy and central cicatrix. There is a fine chance for an iridectomy in both eyes, which may in time have to be followed by operations for squint.

The following case is reported by my partner, Dr. J. W. Lambert:

Case 4.—J. E. L., æt. 18, occupation, painter.

History.—Was attacked with an acute ophthalmia ten days ago. Physicians in attendance failed to recognize the true form of the disease.

Status Præsens.—Found cornea perforated in centre, iris protruding, crys. lens escaped, terrible œdema and swelling of oc. and palp. conjunctivæ, the most copious discharge we have ever seen in such a case.

Diagnosis.—Gonorrhœal ophthalmia of ten days in *R. E.*

Prognosis.—Can be imagined.

Treatment.—Having learned to rely upon our favorite prescription, we at once set to work; but in this case used warm applications and a carefully graduated compress bandage. Used also atropia solution freely, and at the end of one week's care and careful nursing the eyeball was saved in only a slightly atrophied condition; anterior chamber absent, with a complete syn. ant. Five years have elapsed since the treatment, and the eye looks passably well; cosmetic effect good; eye remains quiet; patient greatly pleased to be relieved so speedily and able to resume his work.

It will be observed that we are relating our worst cases. I might add that I am a pioneer in this part of the State in

this special practice, and the history of these cases and similar ones has shown me the ignorance of a majority of general physicians in ophthalmological literature.

CASE 5.—First infant of T. H. H., æt. 7 weeks.

History.—Case came here from home in Michigan. Was attacked with an acute inflammation in eyes when three days old. Was attended by a physician. The case not progressing favorably, they took the infant to Toledo, O., and consulted *oculists* there, but their prognosis was so unfavorable that they brought the infant to me, on account of a previous acquaintance.

Status Præsens.—Both corneas have ruptured, but lens has not escaped; iris protruding, copious purulent discharge, globes almost immovable from the intense œdema and swelling. The upper lids reached down nearly on a level with the end of the nose; the lids granulated.

Diagnosis.—Oph. neonatorum of three weeks' standing.

Prognosis.—Could promise nothing.

Treatment.—Careful cleansing, warm water application and the use of the prescription mentioned. I made eleven visits to the house in the course of five days, and carried out the same plan of treatment named in the other cases, and discharged the case at the end, this time relieved of its trouble. The child is now four years old, and can be seen on our streets most any day. Its present condition is two full-sized eyes with healthy, movable pupils. *R. E. Tn, S* very good. *L. E.* has a larger central leucoma than the *R.* Patient can go about the city alone, and has practically a good field of vision. There is a splendid chance for iridectomy. There is some strabismus convergens and some nystagmus.

CASE 6.—Second infant of same parents, æt. seven days; residence, Goshen, Ind. I was called to attend case when child was ten days old.

History.—Inflamed *R. E.* since two days old. Parents stated that the utmost care had been taken to cleanse the eye and not expose it to a bright light. Parents were greatly alarmed and anxious.

Condition.—Discharge was creamy in consistence, and greenish-yellow in color, and very copious; considerable œdema of lids, so much so that I could not investigate condition of cornea.

Treatment.—Everted lids and cleansed with luke-warm water;

instilled atropia drops; ordered oft-repeated cleansings; applied my favorite sol., which is tonic, astringent, and sedative. Visited patient next morning; found all the symptoms ameliorated. The eye continued to improve from this time on, and the case was discharged entirely well at the end of eight visits in four days.

Remarks.—Zinci chloridi seems to act as a specific remedy, changing the thick creamy discharge to a thin muco-purulent, and seems to destroy the specific virus. After the second or third application, the discharge, if not entirely, nearly ceases, and the swelling of the oc. and palp. conjunctivæ passes rapidly away. The patients do not complain at all of the treatment, and in fact it proves a boon to them, and they are anxious for a repetition of the treatment. The remedy seems to act at once to prevent or arrest the breaking down of the corneal and other tissues. We have had fortunate results in all the cases not mentioned, and especially so where the patient was seen at the very outset of the attack. We are forced to the conclusion that upon trial this course of treatment will prove fully as successful in other hands.

QUARTERLY ABSTRACT OF AMERICAN OPHTHALMOLOGICAL LITERATURE.*

By Dr. SWAN M. BURNETT, of Washington.

1. Cross-eye; its origin, prevention and treatment. By John Green. *St. Louis Med. and Surg. Jour.*, August 5th.

In this paper G. points out the cause of convergent squint to be a disturbance of the normal relation between accommodation and convergence, and suggests as an important therapeutic measure, particularly in the early stages, a paralysis of the accommodation by a mydriatic, the paralysis to be continued for months if necessary, the A. being supplied by means of convex glasses. He reports important results from this method in his practice.

2. A case of marked intoxication, with delirium, from the use of duboisin in ophthalmic practice. By C. J. Lundy. *Mich. Med. News*, August 10th.

The quantity of the drug used (by instillation) could not have exceeded $\frac{1}{60}$ of a grain.

3. Ossification of the choroid, malignant tumor, enucleation, and sympathetic ophthalmia. By W. R. Amick. *Cincinnati Med. News*, August.

The specific character of the tumor was not made out. The sympathetic ophthalmia was relieved by the enucleation.

4. On affections of the eye consequent upon whooping-cough By M. Landesberg. *Med. and Surg. Reporter*, September 18th.

L. reports four cases in which, in addition to the ordinary conjunctival ecchymosis to be found in this affection, there was other serious disease.

In Case 1 there was serous infiltration of the retina, o. d. some-

* Authors of papers are requested to send one copy to Dr. H. Knapp, 25 W. 24th Street, N. Y., and another to Dr. Swan M. Burnett, 1215 I Street, Washington, D.C.

what swollen, m. l. red, arteries thin, veins engorged and tortuous. The two upper arterial branches were found to be permanently obliterated, and V. was reduced to $\frac{1}{10}$. In Case 2 there was complete exophthalmus of the right ball. In Case 3 there was ecchymosis in the retina. In Case 4 there was a subluxation of the lens in *R. E.*

5. A contribution to the clinical history of myopia. By S. D. RISLEY. *Amer. Jour. Med. Sci.*, October.

R. gives the histories in full of four cases in which the refraction passed over from the hypermetropic to the myopic condition. In case 1 H.As. passed into M.As., the meridian of greatest refraction being retained. Case 2, the same. Case 3, H., with high degree of insufficiency of int. rect. converted into M., with some As. in left. Case 4, H. converted into M.As.

6. A new mydriatic. By H. S. SCHELL. *Phila. Med. Times*, October 6.

Schell has made eleven experiments with the homatropin hydrobromate, and from these deduces the following conclusions:

1. Homatropin hydrobromate is not well adapted to the treatment of inflammatory or traumatic affections of the eye on account of the conjunctival irritation it produces.

2. It is especially adapted to the production of that temporary dilatation of the pupil and paralysis of the ciliary muscle which is so often required in examining the condition of refraction.

3. The best solution to use is one containing 16 grs. to 1 $\frac{3}{}$ fl. aq. From one to five drops of such a solution may be required to produce the desired effect, according to the strength and activity of the ciliary muscle.

4. Under the influence of a full dose the pupil attains its maximum dilatation in about 20 minutes.

5. With a full dose the accommodation begins to fail in about ten minutes, and is usually totally suppressed in half an hour, although exceptional cases may require an hour. This total suppression lasts about three hours; the accommodation then gradually recovers itself, and is fully in action again at the end of 10 or 30 hours from the time of last instillation.

6. The local action of the mydriatic is not accompanied by any unpleasant effects upon the general system.

7. On sclerotomy in glaucoma. By M. LANDESBERG. *Phila. Med. Times*, October 9th.

From 35 cases, embracing all varieties of glaucoma, L. does not

hesitate to put forth sclerotomy as a first indication in the following conditions:

1. In glaucoma absolutum.

2. In secondary glaucoma, and in glaucoma-like conditions of the eye, as observed in iritis, serous choroiditis, in certain forms of keratitis, etc.

3. In all cases of glaucoma in which iridectomy has been made and the reappearance of the glaucomatous process necessitates the repetition of the operative procedure.

8. The cure of constitutional diseases by the use of glasses. By D. B. St. John Roosa. *N. Y. Med. Record*, October 9th.

In summing up the matter, R. says: "Glasses for the old, as invented by an Italian, for the short-sighted, as invented by an unknown man, and for the young, who are hypermetropic, as their use was suggested by Donders, are an inestimable boon; but it remains to be proven that the use of glasses, either convex or prismatic, or division of the internal or external recti muscles, will cure any constitutional affection, such as chorea, epilepsy, and hystero-epilepsy."

9. Spinal myosis and reflex pupillary immobility. By W. Erb. *Archives of Med.*, October.

Prof. E., in this exceedingly interesting paper, considers these two conditions with special reference to their presence in tabes dorsalis. In 84 cases of this disease he has found absolute reflex immobility of the pupil in 59 cases; weak, slow, and inexpansive reaction to light 12 times. Only 37 were associated with myosis. The two conditions are, therefore, by no means invariably associated, and cannot depend upon one and the same morbid alteration. He says: "In explanation of the reflex immobility we can only maintain that that portion of the reflex tract is affected which lies between the optic and oculo-motor centres, for if the lesion were located in the peripheral optic tract, then the vision could not remain normal; while if the peripheral oculo-motor tract were the seat of the lesion, the pupil would not contract from accommodative impulses. We must, therefore, consider that small portion of the reflex tract—the location of which needs in many respects to be more exactly determined—as the diseased part whence originates the reflex immobility. For the myosis we must refer to changes in the dilatator pupillæ, whose centre is said to be in the medulla oblongata, and sends the principal part of its mass in the cervical cord down to the cilio-spinal centre."

A diagram is given showing the localities of the lesions which produce the two conditions.

10. A case of Basedow's disease, terminating in total loss of sight from inflammation of the cornea. By H. G. CORNWELL. *Amer. Jour. Med. Sci.*, October.

The cause of this rare result of Basedow's disease C. thinks is due: 1, to exposure of the eyeballs to the air, and wholly dissociated from any affection of the fifth pair or ganglion of Gasser; 2, to the affection of the trophic nerves *alone*, rendering the eye unable to resist the injurious influences of the air, dust, etc.

11. Examination of the eye as a help to the diagnosis of extra-ocular disease. By N. E. WORDIN. *Proceedings Conn. Med. Soc.*, 1880.

No original suggestions are offered, but an extensive, though by no means full, compilation of facts, gleaned from various sources, is given.

12. The ophthalmic use of quinine and its therapeutic action. By A. SIBLY CAMPBELL. *Trans. Med. Asso. of Georgia*, 1880.

Under the above title C. communicates some cases in which he has used quinine with apparent benefit. He thinks it particularly beneficial in the inflammation following operations, and accounts for it by the *constringent* action of the drug in the vascular walls. The author is not aware, probably, that Rossa has found a *congestion* of the optic nerve, and *Mt.* to follow full doses of quinine.

13. Notes on the action of duboisin. By CHAS. DEADY. *Trans. Amer. Homœopath. Oph. and Otol. Soc.*, 1880.

D. has found duboisin useful in ulcus cornea marginalis in solution of 8 gr. to ℥ j aq. locally.

14. Eserin in glaucoma; a case. By J. A. CAMPBELL. *Ib.*

C. saw a case of acute glaucoma, probably caused by atropine dropped into an eye already predisposed, cured by one instillation of eserin. V. was brought from p.l. up to an ability to read.

15. Pathological contributions. By J. H. BUFFUM. *Ib.*

1. Sarcoma orbitæ; its point of origin is not stated. 2. Bilateral glioma; death. 3. Glioma of N. O. with relapse.

16. Symmetrical binocular coloboma of the iris and choroid. By C. H. VILAS. *Ib.*

The coloboma was $\frac{3}{16}$ of an inch in width and situated at the junction of the middle and lower thirds of the inferior nasal quadrant of the iris, extending back through the choroid, we presume (though it is not stated), to the o. n.

17. Reflex aphasia from a glaucomatous bulbus. By A. WANSTALL. *Ib.*

This is an interesting case to the neuropathologist as well as the oculist. From the clinical history, which is given in detail, it appears that a marked aphasia, which was the concomitant of an eye trouble in which there was + tension (whether primary or secondary is not clear), was thoroughly dispelled after an enucleation of the ball.

REPORT ON THE PROGRESS OF OPHTHALMOLOGY FOR THE SECOND HALF OF THE YEAR 1879.

(*Continued from Vol. ix., p.* 375.)

By Dr. H. MAGNUS, of Breslau, and Dr. A. NIEDEN, of Bochum.

Translated by Dr. R. O. Born, of New York.

III.—THERAPEUTICS.

MEDICAMENTOUS THERAPEUTICS.

Atropine, Duboisine, Eserine, Jaborandi, Pilocarpine.

627. Albertoni. The action and composition of jaborandi. (*Arch. of Experim. Path.*, vol. xi, p. 415.)

628. Benavente treats of the physiological and therapeutic action of pilocarpine. (*Rev. de Med. y Chirurg. Pract.*, Madrid, 1879, vol. iii.)

629. Birnbacher. The use of eserine and pilocarpine in diseases of the eye. (*Mittheil. d. Vereins d. Aerzte in Steiermark*, vol. xv.)

630. Bribosia wants to treat inflammatory reaction after cataract operations by injections of pilocarpine and the artificial leech. (*Internat. Med. Congr.*, Amsterdam. *C. f. A.*, p. 308.)

631. Buffum. Duboisine in a solution of 0.5 per cent. (*Amer. Homœopath. Ophth. and Otol. Soc. C. f. A.*, p. 331.)

632. Carl. A case of duboisine-intoxication. (*Z. M.*, 1879, p. 337.) After 3–4 drops of a one-per-cent. solution dryness of the throat, somnolence and delirium, lasting several hours (in a child). (Comp. Nos. 639, 649.)

633. CHALOT. Les injections hypodermiques de chlorhydrate de pilocarpine après l' opération de la cataracte et dans quelques autres cas. (*Congr. de Montpellier*, Aug. 29, 1879 ; *Gaz. Med de Paris*, No. 37.) During the discussion many French oculists advised against its use.

634. DOYER. Atropine, daturine, duboisine, eserine, gelsemine, pilocarpine. (*Internat. Med. Congr.*, Amsterdam. *C. f. A.*, p. 308.) The action of eserine has a relation to pilocarpine as 32:1. Small doses of eserine act only upon the pupil, not upon the accommodation. Small doses of pilocarpine act upon both. The myopia after eserine is higher, but of shorter duration than after pilocarpine ; the myopia from eserine can reach five dioptrics. The action of pilocarpine upon the pupil appears only after a quarter of an hour ; the time of the action of eserine depends only upon the dose. The action of pilocarpine has passed off after 24 hours ; that of eserine lasts four days. A minimum dose of gelsemine acts after one hour, and its action disappears after two hours ; atropine acts after one, ceases after 24 hours ; daturine acts after 1.7, ceases after 24 hours ; duboisine acts after 2.5, and ceases after 24 hours. In all of them the mydriasis precedes their effect upon the accommodation.

635. VAN DUYSE. La pilocarpine, son action physiologique et son emploi dans la thérapeutique oculaire. (*Gand.*, 1879)

636. GALEZOWSKY-PARENT have treated two cases of blennorrhœa of the new-born with arg. nitr. 0.02 ; vaseline 5.0, and eserine 0.02 : aq. 10.0. (*R. d'O.*, p. 704.)

637. GÉLIS. Contribution à l'étude de l'esérine dans les abcès et les ulcères de la cornée. (*Thèse de Paris*, 1879.)

638. JAVAL. Traitement palliatif de la cataracte (instillation d'atropine). (*Soc. de Biol.*, November 15, 1879.)

639. JONES. Eserine, pilocarpine, duboisine, gelsemine. (*Brit. Med. Assoc.*, Cork, Aug. 5–8, 1879. *C. f. A.*, p. 238.) He recommends the hydrobromate of eserine in marginal corneal ulcers, in perforation of the cornea, in traumatic keratitis, in suppuration of the cornea after extraction, in mydriasis, diplopia, asthenopia, disturbances of accommodation, glaucoma. Gelsemine (0.3: 30.0) for ophthalmoscopic purposes on account of the short mydriasis. Duboisine in those cases where atropine produces local reaction. Andrew, Swanzy, Story, Nettleship, call attention to the frequency of duboisine-intoxication.

640. JUST. Pilocarpinum muriaticum as a myotic. (*Wiener Med. Wochenschr.*, 1879, No. 31.)

641. KOWALEWSKY reports on atropine-psychosis. (*Allg. Zeitschr. f. Psych.*, vol. xxxvi.)

642. LANDESBERG. The therapeutic use of eserine in glaucoma. (*A. O.*, vol. viii, p. 264.) Eserine is not only an unreliable, but also a very dangerous remedy since, by its primary results, it may lull the patient as well as the attending physician into a delusive security, endangering thus the favorable chances of another more efficacious therapeutic action. Our first indication in glaucoma must still be the operation.

643. LANDESBERG. On the therapeutic use of duboisia in eye disease. (*Med. and Surg. Rep.*, Philadelphia, 1879, No. 29.)

644. LANDESBERG. The therapeutic use of jaborandi and muriate of pilocarpine in eye diseases. (*A. O.*, vol. viii, p. 118.) Both are effective in the absorption of intra-ocular hemorrhages, opacities of the vitreous and serous effusions. It is advisable to begin at first with the smallest dose, and to act afterward according to individual indications. Subcutaneous injections of pilocarpine are generally better borne than the internal administration of jaborandi. In regard to the myotic qualities, eserine is greatly superior to pilocarpine.

645. LOISON. La duboisine. (*Revue Méd. Franç. et Étrang.*, September, 1879.)

646. MONIER. De l'emploi de l'esérine contre les affections de la cornée. (*Marseille Méd.*, vol. xvi, p. 20.)

647. POOLEY. The use of eserine in acute glaucoma. (*Arch. of Med.*, vol. i, 3, p. 283.)

648. RAMPOLDI. The indications and counter-indications of the use of eserine. (*A. d'Ott.*, vol. viii, p. 335.)

649. SEELY. On the use of duboisine. (*A. O.*, vol. viii, p. 79.) It does not irritate the conjunctiva, but it is liable to produce constitutional symptoms. A three-grain solution will answer any purpose. (Comp. *A. O.*, vol. ix, 1, No. 175.)

650. SPILLMANN. Notes sur la pilocarpine. (*Arch. Génér.*, September, 1879.)

651. STRAUSS. L'action et antagonisme locaux des injections hypodermiques de pilocarpine et de l'atropine. (*Arch. Génér.*, September, 1879.)

652. TICHBORNE. Le salicylate d'atropine. (*France Méd.*, No. 88.)

653. VIDOR. Does the use of eserine injure the eye? (*Pester Med. Chir. Presse*, vol. xv.)

Diversa.

654. BERRY. Note on the active treatment of severe cases of primary keratitis. (*Edinb. Med. Journal*, Nov., 1879.) Arg. nitr. 0.25 : aq. 25.0.

655. BRIÈRE. The danger of aq. laurocerasi, saturated with tincture of iodine, as an eye-wash. (*Gaz. des Hôp.*, 65.)

656. CARRÉ. Des onctions et des injections hypodermiques au pourtour de l'orbite, inutilité du choix de cette région dans beaucoup de cas. (*Gaz. d'Ophth.*, July, 1879.)

657. CHEVREL. Des différents terminaisons et du traitement de la conjonctivite diphthéritique. (*Thèse de Paris*, 1879.)

658. DOR. Benzoate of soda in purulent ophthalmia. (Ber. d. 12. Vers. d. Ophth. Gesellsch., *Z. M.*, vol. xvii.)

659. FANO has cured hysterical amblyopia by antispasmodic remedies. (*J. d'O.*, vol. vii, 38.)

660. FÈVRE. Du kératocône et en particulier de son traitement. (*Thèse de Paris*, 1879.)

661. IMRE. Borax in blennorrhœa. (*Szemészet Budapest*, 1879, 17–21.)

662. MANNHARDT. The action of strychnine. (*A. f. O.*, vol. xxv, 2.)

663. MÉJASSON. Des blessures de la cornée au point de vue du prognostic et du traitement. (*Thèse de Paris*, 1879.)

664. MORANO. Patogenesi e cura del distacco retinico. (*G. O.*, vol. ii, p. 29.)

665. REID. The treatment of traumatic affections of the cornea. (*Glasgow Med. Journ.*, Nov. 1879.)

666. SCHLÄFKE. The use of iodide of potassium and calomel in eye diseases. (*A. f. O.*, vol. xxv, 2.)

667. SMITH. Practical hints on the treatment of corneal affections. (*Michigan Med. News*, Detroit, 1879, vol. ii.)

668. VOSE SOLOMON. 1–2 grains of belladonna leaves, internally three times daily, in epiphora of a neurotic character. (*C. f. A.*, p. 239.)

669. WOLFRING. Ciliary neuralgia and the importance of morphine for the therapeutics of eye diseases. (*Przeglad Lekarski*, 1879, p. 254.) A solution of 1:16 acts from the conjunctiva as a sedative, especially in keratitis, less in iritis.

PHYSICAL THERAPEUTICS.

Electro-Therapeutics and Actual Cautery.

670. BERGH has treated descending atrophy of the optic nerve with strychnine and electricity. (*Hygiea*, 1879.)

671. BUFFUM treats strictures of the lachrymal canal with electrolysis. (*Transact. Amer. Homœop. Ophth. Soc. C. f. A.*, p. 331.)

672. COURSSERANT. Du traitement de la kératite phlycténulaire par la cautérisation ignée. (*Journ. de Conn. Méd. Prat.*, Paris, 1879, vol. i.)

673. FANO has treated right-sided hemiopia with moxocausis. (*J. d'O.*, 1879, vol. vii, 22.) Also spinal amaurosis. (vol. vii, 24.)

674. GAYET treats keratoconus and indolent corneal ulcers with the actual cautery. (*Intern. Med. Congr. C. f. A.*, p. 309.)

675. GILLET DE GRANDMONT treats phlyctænulæ with the galvano-cautery. (*A. d'O.*, vol. lxxxi, p. 181.)

676. GORECKI. Traitement rapide des maladies des voies lachrymales par le dacryo-cautère. (*Thèse de Paris*, 1879, and *Praticien*, Paris, 1879, vol. ii.)

677. HANSEN. Corneal abscess cured with the actual cautery. (*Hosp. Tid.*, 1879, Nos. 11 and 12.)

678. MARTIN. Naevus de l'orbite, traité et guéri par l'électrolyse. (*A. d'O.*, 1879, July, August.)

679. MARTIN treats corneal ulcers with the actual cautery. (*Intern. Med. Congr. C. f. A.*, p. 309.)

680. NIEWODNICZARSKI has cured corneal opacities by electricity. (*Med.*, 1879.)

681. SATTLER recommends in keratitis antiseptic treatment and the use of the actual cautery. (*Ber. d. 12. Vers. d. Ophth. Ges., Z. M.*, vol. xvii.)

Metallo-Therapeutics and Magnet.

682. BEAUMETZ has cured hysterical blindness with metallotherapeutics and electricity. (*Gaz. des Hôp.*, Nos. 55 and 56.)

683. DOUGLAS. Étude clinique sur la métalloscopie et la métallothérapie externe dans l'anesthésie. (*Thèse de Paris*, 1879.)

684. HIRSCHBERG. Successful removal of a piece of iron from the eye with the electro-magnet. (*Berl. Klin. Wochenschr.*,

1879, No. 46.) A boy 16 years old, had been injured by a piece of iron, the foreign body had caused a horizontal wound 2½ *mm.* long, at a distance of 1½ *mm.* from the upper corneal margin, and was lying behind the transparent lens free in the lower half of the clear vitreous. The following day, Hirschberg operated under deep narkosis. The globe was opened by an equatorial incision between the external and inferior recti muscles, beginning behind the ciliary body and extending 8 *mm.* backward; then the curved end of his electro-magnet was introduced, and a piece of iron weighing 20 milligrammes was extracted. Healing without reaction. Sn. 1.5, visual field complete, except a small defect inward and upward corresponding to the divided optic-nerve fibres. The scleral scar could be seen with the ophthalmoscope. After three months the result unchanged. He speaks of the removal of foreign bodies from the eye with the magnet and of the scleral sections made for that purpose. "Real triumphs are gained with the magnet only in those cases where we have to deal with a piece of iron which has but recently entered and is suspended in the vitreous, and which, with forceps, hooks and spoons, can but rarely be removed without permanent damage to the eyeball."

685. MANCHÉ wants to use the magnet also for the extraction of foreign bodies from the iris and the surface of the lens. (*A. d'Ott.*, H. 2 and 3.) The reviewer wishes to recall the fact that for the extraction of iron splinters from the cornea the magnet had been used as early as 1646, by *Fabricius Hildanus*, and, as he expressly mentions, at the suggestion of his wife. Comp. Fabr. Hildani opera observationum et curationum. Frankfort-on-the-Main, 1646, Cent. 5, Obs. 21. (Unfortunately, just for that purpose it was as unnecessary as ineffective.)

Diversa.

686. CUIGNET. Amblyopies hystériques modifiées par des verres numérotés et colorés. (*R. d'O.*, 1879, 3, S. 1.)

687. FIEUZAL. Usages des verres colorés en hygiène oculaire. (*Bullet. de la Soc. de Méd. Publ.*)

688. GRADENIGO. Massage of the eye. (*Atti dell'Assoz. Ottal. Ital.*, Settemb., 1879.)

689. RÄHLMANN proposes to correct keratoconus with hyperbolic glasses. (*Ber. d. 12, Vers. d. Ophth. Ges., Z. M.*, vol. xvii.)

690. READ. Des troubles nerveux guéris par les lunettes. (Proc. of the Med. Soc. of the County of Kings, 1879, vol. iv.)

OPERATIVE THERAPEUTICS.

Glaucoma.

691. BOWMAN. Sclerotomy is preferable in many cases, but Bowman leaves it undecided in which. Before the operation eserine, during the operation anæsthesia, later especial care that the bandage is not too tight. (*Intern. Med. Congr.*, Amsterdam, 1879.)

692. JANY. The effect of sclerotomy. (*Ber. de 12. Vers. d. Ophth. Ges., Z. M.*, vol. xvii.) He recommends *Graefe's* knife which he prefers to *Wecker's* sclerotome. When eserine does not act and when the anterior chamber is very shallow, he finds this operation counterindicated.

693. JAUMES. Sur la guérison du glaucome simple par sclérotomie. (*Congr. de Montpellier, Gaz. Méd.*, No. 37.)

694. MARTIN. Nouveau procédé de sclérotomie. He explains his procedure as "sclérotomie à incision unique en plusieurs temps." (*A. d'O.*, 1879, Nov., Decemb.) He punctures and enlarges the section with scissors.

695. SMITH. Glaucoma, its causes, symptoms, pathology and treatment. (*London*, 1879, Churchill.)

696. TERSON. De la sclérotomie dans le glaucome et dans quelques autres affections oculaires. (*Rev. Méd. de Toulouse*, vol. xiii, p. 113.)

697. DE WECKER. La guérison de glaucome simple par la sclérotomie. (*Congr. de Montpellier* and *Internat. Med. Congr., C. f. A.*, p. 311; and *Brit. Med. Assoc., C. f. A.*, p. 236.) In every form of chronic simple glaucoma the iridectomy can be replaced by sclerotomy; also in those cases of inflammatory glaucoma, which by myotics can be reduced to the simple forms, and in which eserine produces a distinct myosis. He reserves iridectomy for attacks of acute glaucoma or for those inflammatory cases in which the high tension cannot be reduced by myotics. In discussing the question, *Hirschberg* prefers iridectomy, *Walker* and *Wolfe* speak in favor of *Hancock's* sclerotomy, which is also used in a modified form by *Vose-Solomon* and *Prichard.*

Cataract.

698. COLLICA-ACCORDINO. De l'extraction de la lentille cataractée dans la capsule. (*Mov. Napoli.*, 1879, 2 S., vol. i, p. 41.)

699. FITZGERALD speaks on *Knapp's* peripheric capsulotomy at the meeting of the *Brit. Med. Assoc.* (*C. f. A.*, p. 234.) Advantage: speedy healing without reaction; disadvantage: greater frequency of subsequent discissions. He had operated on 25 cases after this method without a loss.

700. FREYER. Observations on cataract in India, with an analysis of 512 cases operated on in Azamgarh Hospital during the year 1878. (*The Lancet*, 1879, Nos. 9 and 10.)

701. GAYET. Peripheric capsulotomy. (*Gaz. Hebd.*, No. 35, 1879.)

702. JANY. Two cases of double-sided diabetic cataract operated on by suction, with some remarks on this operative procedure. (*A. f. A.*, vol. ix, p. 263.) It is proper in soft cataracts of young persons; Jany does not say that it has any particular advantages over linear extraction. Extensive discission of the capsule should always be made several days before the suction; but care should be taken not to rupture the zonula.

703. KNAPP. Report and remarks on a sixth hundred of cataract extractions, performed according to *v. Graefe's* method. (*A. O.*, vol. viii, p. 200.) Important remarks on peripheric capsulotomy.

704. LANDOLT. Cataract extractions. (*C. f. A.*, p. 232.) Advantages of extraction without iridectomy are: 1. Absence of hæmorrhage during the operation. 2. Integrity of the sphincter muscle. 3. Regulation of the amount of light entering the eye. 4. Possibility of operating downward. Disadvantages: 1. Difficulty of removing remnants of cortical matter. 2. Danger of prolapse of iris during the first 24 hours. This method, therefore, is especially suited for all those cataracts, the cortex of which will come out without difficulty.

705. MORTON. Operations for senile cataract at the Moorfields hospital during eleven months. (*Ophth. Hosp. Rep.*, vol. ix, p. 3.)

706. QUIOC. La discision périphérique ou équatoriale avec la conservation des deux cristalloïdes dans l'extraction linéaire périphérique de la cataracte. (*Thèse de Paris*, 1879.) Shows that the peripheric opening of the capsule was first described and methodically practised by *Gayet*, of Lyons.

707. SARRAZINI. Recherches sur la cataracte traumatique au point de vue du diagnostic et du traitement. (*Thèse de Paris*, 1879.)

708. v. WECKER. Linear section and flap section. (*Z. M.*, vol. xvii, p. 396.)

709. WOLFE speaks (at the meeting of the *Brit. Med. Assoc.*, *C. f. A.*, p. 235) of the reduction of bad results after extractions. In senile cataract he makes, 2-3 weeks before the operation, a downward iridectomy with preservation of the ciliary margin of the iris. At the extraction the eye is kept open with a speculum, the fixation forceps applied and the cornea separated from the sclerotic to the extent of 1''' more than $\frac{1}{4}$ of its circumference; the centre, however, remains undivided. All the instruments are now removed and the capsule is opened; the section is then completed with a blunt-pointed knife and the lens removed by pressure with the finger.

Neurotomia-Optico Ciliaris.

710. ABADIE. De la section des nerfs optique et ciliaires substituée à l'énucléation du globe oculaire. (Presented to the *Soc. de Chirurg.*, Nov. 19, 1879.)

711. BOUCHERON. Traitement de l'ophthalmie sympathique par la section des nerfs optique et ciliaires. (*Soc. de Biol.*, Aug. 9, 1879. *Progrès. Méd.*, No. 34. *Compt. Rend. Hebd. de l'Acad.*, No. 15.)

712. DOR. Section du nerf optique et des nerfs ciliaires postérieurs. (*Lyon. Méd.*, 1879.)

713. GIRAUD-TEULON reports (to the *Soc. de Chir.*, Dec. 17, 1879) on the neurotomy of *Abadie* and *Dianoux*. (*Progr. Méd.*, No. 51.)

714. SCHMIDT-RIMPLER. Neurotomia optico-ciliaris. (*Berl. Klin. Wochenschr.*, No. 46.)

715. WADSWORTH communicates a case of neurotomia optico-ciliaris. (*Boston Med. and Surg. Journ.*, 1879.)

716. WARLOMONT. De l'énervation du globe de l'œil. (*A. d'O.*, 1879, Nov., Dec.) He adopts the name enervation of the eye which had been proposed by *Dianoux*. He gives a sketch of the historical development of the operation.

Operations on the Lids.

717. AUB. Ectropion treated by transplantation of flaps without a pedicle. (*A. O.*, vol. viii, p. 94.) *Wolfe's* method gave a complete success in two cases.

718. BUSINELLI recommends his new blepharoplastic method, a bridge-like flap with a double pedicle. (*Atti dell' Assoz. Ottalm. Ital., Z. M.*, vol. xviii, p. 60.)

719. CAYBY. Operations for entropion and trichiasis. (*Indian M. Gazette*, Calcutta, 1879, vol. xiv.)

720. GAYET speaks (at the *Intern. Med. Congr.* at *Amsterdam*) on his new method of operating for entropion. First incision behind the ciliae above the margin of the lid ; then a flap of skin is formed at the outer or inner angle of the eye and stitched into the wound along the lid-margin with a few sutures. (*C. f. A.*, p. 309.)

721. HOTZ. A new operation for entropion and trichiasis. (*A. O.*, vol. viii, p. 249.) Incision along the upper margin of the tarsus ; removal of a strip of the muscular layer, three *mm.* broad ; then application of four sutures, above and below, only through the skin of the lid, but in the depth through the aponeurosis upon the upper third of the tarsus, in order to unite the skin of the lid firmly to the upper margin of the tarsus.

722. HOTZ. On the so-called ptosis atonica, its nature and treatment. (*A. O.*, vol. viii, p. 400.) He unites the skin of the lid with the upper margin of the tarsus in a similar manner as in his entropium operation.

723. MACNAUGHTON JONES reports on plastic operations in deformities of the eyelids. (*The Lancet*, No. 21.)

724. MARTIN. Blepharoplasty after *Wolfe's* method. The flap which has been freed from fat and connective tissue should be kept warm and pressure applied. (*Intern. Med., Congr. C. f. A.*, p. 309.)

725. MICHEL. The pathology and treatment of trichiasis and distichiasis. (*St. Louis Cour. of Med.*, 1879, vol. i, p. 121.) Criticized by *Green* (ibid., p. 339) and reply of *Michel* (p. 424).

726. WARLOMONT-CRITCHETT. Palpebrotomy in blennorrhoic diseases. (*Intern. Med. Congr. C. f. A.*, p. 327.) *Hirschberg's* objections to the operation (ibidem).

Operations on the Conjunctiva and Lachrymal Organs.

727. ABADIE. De quelques indications nouvelles d'exstirpation de la glande lacrymale. (*Gaz. des Hôp.*, 1879, June 14.)

728. CARRÉ. Nouveau couteau pour l'opération de Stilling. (*Soc. de Chir.*, Octob. 8, 1879.)

729. GIFFO treats granulations by excision of the transition fold. (*R. d'O.*, 1879, Oct.) He recommends cauterization first, and only when this fails he resorts to the excision.

730. LINDH. Incision of the lachrymal canaliculi. (*Erai. Göteborg.*, 1879, vol. iii.)

731. MAUREL. Modification au procédé de *Desmarres* pour l'opération du pterygion. (*Bull. Gén. de Thér.*, 1879, Oct. 30.)

732. MUNAR describes (*Gaz. Méd. de Barcelona*) the following operation for pterygium. It is separated from the apex up to the basis from the underlying tissues, folded back and stitched in such a manner that the surface of the pterygium is directed toward the surface of the globe.

Diversa.

733. BUSINELLI demonstrated a lance-shaped instrument for paracentesis or removal of foreign bodies, etc. (*Atti dell' Assoz. Ottal. Ital.*, Napoli. *Z. M.*, vol. xviii.)

734. CHRISTENSEN treats detachment of the retina by puncture and compressive bandage. (*Ugeskrift for Læger.*, 1879, No. 23.)

735. DÜRR. The results of attempted keratoplasty. (*Z. M.*, vol. xvii, p. 317.) He has made the operation thirteen times, but only in two cases he obtained some result; lasting complete transparency he has never observed.

736. GALEZOWSKY. Lister's method in operations upon the eye. (*R. d'O.*, Oct.) Solution of phenyl (1:1.000) should be used in lid-operations and enucleation, and the lids should be washed with it before extraction of cataract; in corneal abscesses, antiseptic ointment (boracic acid 0.1, vaseline 10.0). In cataract extractions, boracic acid (1:100) to disinfect the instruments.

737. v. JAEGER. A case of successful extraction of a piece of gun-cap from the posterior chamber of the eye. (*A. O.*, vol. viii, p. 396.)

738. KNAPP. Three cases of successful removal of sarcoma of the iris. (*A. O.*, vol. viii, p. 82.) The section should be in the sclero-corneal junction, it should be curved not linear, and large enough to make the tumor and the adjacent part of the iris prolapse on pressure upon the scleral lip of the section. The whole base of the protruded part is grasped between the blades of a strong pair of forceps, the branches of which are toothed to the

extent of 4 or 5 *mm.*, and the iris exsected as peripherically as possible.

739. MULES. A modification of squint-operation. (*Brit. Med. Journ.*, 1879, June 21.)

740. SAKELLARIOS. Quelques considérations sur le strabisme et en particulier sur le manuel opératoire de la strabotomie. (*Thèse de Lyon*, 1879.)

741. SIMI reports a cure of keratoconus by a platina-seton. (*Le Sperimentale*, vol. xliii, p. 382.)

742. SNELLEN. The antiseptic method in eye-operations. (*Intern. Med. Congr. C. f. A.*, p. 310.) The lids and also the hands of the operator are washed with a 2 per-cent. solution of carbolic acid. The instruments must be disinfected with alcohol, not with carbolic acid, which makes them blunt. No spray.

743. WATSON has cured traumatic ophthalmia by trepanation of the sclerotic. (*Brit. Med. Journ.*, 1879, June 21.)

744. WOLFE. On corneal transplantation. (*Med. Times and Gaz.*, 1879, No. 1534, Nov. 22.) He draws the following conclusions: 1. The cornea can be transplanted from one place to another without loss of vitality or transparency; but it must be taken from an eye which has just been enucleated. 2. The corneal section must be sharp and clean, and the size of the removed pieces must be exactly the same. 3. The operation must be performed without injuring the deeper tissues; transplantation of the entire cornea is therefore absolutely impossible. The prospect of preserving the vitality has an inverse ratio to the size of the transplanted piece.

IV.—PATHOLOGICAL ANATOMY, SPECIAL PATHOLOGY, AND LITERATURE.

BY A. NIEDEN.

PATHOLOGICAL ANATOMY.

745. ADAMÜCK. Contributions to the pathology of the lens. (*A. f. A.*, vol. viii, p. 283.)

746. ANGER, TH. Tuberculosis of the eye. (*Gaz. des Hôp.*, vol. x, p. 75.)

747. BRAILEY. The pathology of glaucoma. He found the periphery of the iris attached to the cornea, the ciliary muscle

atrophic, the larger iris circle, and, in half the cases, also the inner ciliary arteries, dilated. Schlemm's canal frequently narrowed. (*Brit. Med. Journ.*, August 30, 1879.)

748. CARL, DUKE IN BAVARIA. Contributions to the anatomy and pathology of the vitreous. 1. Detachment of the vitreous found in 20 per cent. 2. The relations of the hyaloid limiting membrane under this condition. The author takes the limiting membrane as a layer of the retina, for the detached vitreous is always found without a membranous cover. 3. In some cases of this affection he found the formation of flat, irregularly-shaped endothelial cells upon the inner surface of the limitans. 4. Regeneration in detachment of the vitreous was observed four times in twenty cases, as a thin layer covering the inner surface of the limiting membrane to the extent of several *mm.*, but also as more circumscribed, irregular, gelatinous elevations upon the limitans. 5. Inflammatory processes in the vitreous, with an extensive bibliography of the subject. The author thinks they are caused by the migration of cells from the retina through canals which extend into the vitreous. In six cases, he saw a communication of these canals with cavities within the vitreous which are the same as Schwalbe's fissures (Spalträume) and which have to be regarded as dilatations of those canals and as lymph-channels. (*A. f. O.*, vol. xxv, 3, p. 111.)

749. DEUTSCHMANN. Contributions to the pathology of hæmorrhagic glaucoma (two cases.) (*A. f. O.*, vol. xxv, 3, p. 163.)

750. FUCHS. Keratitis bullosa. He found the wall of the vesicle to consist of new-formed connective tissue covered with corneal epithelium and lying upon Bowman's membrane. (*Ber. d. Ophth. Ges. z. Heidelberg*, Aug. 12, 1879, p. 212.)

751. FUCHS. The propagation of choroidal sarcoma. Distinct sarcomatous cells were found within the blood-vessels of the choroid, which, when carried to other parts, may lead to general infection of the body. (*Ber. d. Ophth. Ges. z. Heidelberg*, August 12, 1879, p. 214.)

752. HAAB. Tuberculosis of the eye. Of eleven cases the conjunctiva was affected six times, the iris four times, the bulbar conjunctiva and choroid in one case. (*A. f. O.*, vol. xxv, 4, p. 163.)

753. HAGEN. The condition of the mucous membrane of the tympanic cavity and conjunctiva after division of the trigeminus in the cranial cavity. He disputes the observations of *Duval* and

Laborde, communicated by *Gellé* (*Gaz. Méd. de Paris*, 1879, No. 1), that lesions of the medulla oblongata are followed by trophic disturbances of the ocular and nasal mucous membrane of the corresponding side. (*A. f. Exper. Pathol.*, 1879.)

754. HÄNSEL. Contributions to the knowledge of tuberculosis of the iris, cornea and conjunctiva, from the vaccination of animals, and four clinical observations. (*A. f. O.*, vol. xxv, 4, p. 1.) Appendix by *Leber* and *Deutschmann*, pp. 276 and 280. (Comp. *Ber. d. Ophth. Ges. z. Heidelberg*, August 12, 1879, p. 193.)

755. HIRSCHBERG. Demonstration of a specimen of retinitis pigmentosa. (*Berl. Klin. Wochenschr.*, No. 47.)

756. JACOBSON, J. Proliferation of epithelium and formation of follicles in the conjunctiva, with special reference to trachoma. He comes to similar conclusions as *Iwanoff* and *Berlin*. (*A. f. O.*, vol. xxv, 2, p. 131 ; and *Inaug.-Dissert.*, September 27, 1879, 46 pages, 3 plates.)

757. KNAPP. Three cases of successful removal of sarcoma of the iris. Anatomical examination. (*A. O.*, vol. viii, p. 82.)

758. KNIES. Contributions to the knowledge of the diseases of the uveal tract. 1. Serous iritis, with remarks on the sympathetic transmission. (*A. O.*, vol. ix, p. 125.)

759. KUHNT. The genesis of neuritis. In neuro-retinitic papillitis he found, instead of the normal constriction of the optic-nerve entrance, a considerable ectasia extending from the inner third of the sclerotic to the choroidal ring, and presenting the shape of 8. The bundles of nerve fibres were swollen, the surrounding retina was pushed aside, the thin-walled central retinal vein and also the perivascular spaces and the central artery were compressed, whereby the overfilling of the veins and the white seams of the arteries might be explained. (*Ber. d. Ophth. Ges. z. Heidelberg*, Aug. 12, 1879, p. 159.)

760. MACGILLAVRY. The pathogenesis of sympathetic ophthalmia. He found the subdural sheath of the optic nerve obstructed by conglomerations of white blood corpuscles. (*Intern. Med. Congr.*, Amsterdam, 1879. *C. f. A.*, vol. i, p. 312.)

761. MÄHLY. Contributions to the anatomy, physiology and pathology of the ciliæ. He proves that the soft black root, which is frequently found in expilation, is not a distinctly pathological product, since it is generally found in 2 per cent. of normal hairs during the first stages of their development. Fungous growths of

the root could only in rare cases be demonstrated in blepharitis. (*Inaug.-Diss.*, Basle, 1879, 4 plates and *Supplement to Z. M.*, 1879.)

762. MANFREDI. Esame anatomico di un piccolo settore di neoplasia iridocigliare e considerazioni critiche per la relativa diagnosi di tuberculosi primitiva dell' iride. (Con tavola, Modena, 4to, 1879.)

763. NEISSER found in gonorrhoic pus and in blennorrhœa of the new-born a peculiar round and relatively large kind of micrococci, which were stained by methyl-violet. (*C. f. M. W.*, 1879, No. 28.)

764. NUËL. A case of intra-ocular neoplasm which presented all the characteristics of a retinal neuroma. (*Intern. Med. Congr.*, Amsterdam, 1879. *C. f. A.*, vol. iii, p. 306.)

765. OELLER. Contributions to the study of chorio-retinitis pigmentosa. (*A. O.*, vol. ix, p. 1.) Not congenital, one-sided, in a phthisical globe. He discusses more fully the colloid formations of the lamina vitrea, resp. of the interior of the eye ; he is opposed to the view that they are formed from the lamina vitrea, but thinks they are myeline structures.

766. QUAGLINO and GUAITA. Leukosarcoma gelatinos. chorioideæ. (*Ann. di Ott.*, 1879, Nos. 2 and 3.)

767. SAEMISCH. Granular-trachomatous conjunctivitis. He defends his view that the granular formations in trachoma are decidedly different from the follicles. (*Intern. Med. Congr.*, Amsterdam, 1879. *C. f. A.*, vol. iii, p. 305.)

768. SAMELSOHN. Tuberculosis of the iris. Successful vaccination. (*Ber. d. Ophth. Ges. z. Heidelberg*, 1879, p. 71.)

769. SATTLER demonstrated a case of pemphigus of the conjunctiva. (*Ber. d. Ophth. Ges. z. Heidelberg*, 1879, p. 227.)

770. VETSCH. Vernal catarrh of the conjunctiva. The epithelial layer of the corneal margin is enormously thickened. A large number of cones, sometimes even in several layers, project into the conjunctiva. The fungus- or hat-shaped excrescences upon the upper tarsal conjunctiva consist of dense connective tissue, resembling cicatricial tissue, and are covered with very dense layers of flattened epithelia. (*Inaug. Dissert.*, Zurich, 1879.)

771. DE VINCENTIIS, CAROLO. Tarsitis scrofulosa. (*Ann. di Ott.*, 1879, Nos. 2 and 3.)

SPECIAL PATHOLOGY.

CONJUNCTIVA.

772. APPIA and GUNNING. Trachoma. G. states that in Amsterdam trachoma occurs among Christians in 3–4 per cent.; among Jews in 40–50 per cent. (*Intern. Med. Congr.*, 1879. *C. f. A.*, vol. iii, p. 310; with remarks of *Hirschberg.*)

773. BORYSIEKIEWICZ. Pemphigus conjunctivæ cachecticus. (*Z. M.*, vol. xvii, p. 326.)

774. CHEVREL, HIPPOLYTE. Des différ. terminaisons et du traitement de la conj. diphthéritique. (*Thèse de Paris*, 1879.)

775. COLLICA ACCORDINO. A case of tubercular conjunctivitis in a child eight months old. (Pract. communications from del Monté's clinic, Naples. *C. f. A.*, vol. iii, p. 315.)

776. DOBSON. Case of development of hair on the eyeball of a dog. (*Jour. of Anat. and Physiol.*, vol. xiv, p. 1.)

777. EPSTEIN states the frequent coincidence of puerperal septicæmia with blennorrhœa neonatorum. (*Arch. f. Kinderh.*, vol. i, 1, p. 44.)

778. FIEUZAL. Contributions à l'étude des kystes sous-conjonctivaux. (*Congr. de Montpelier*, 1879.) Two cases of cysticercus cysts.

779. GALEZOWSKY. Blennorrhœa of the conjunctiva. The author thinks that the density of the connective tissue in adults causes sphacelus of the cornea. (*Rec. d'Ophth.*, July, 1879.)

780. GIFFO. Conjunctival inflammation as a consequence of hay-fever. The symptoms are itching, lachrymation, photophobia. (*Rec. d' Ophth.*, August, 1879.)

781. GOSSELIN. A case of blennorrhoic ophthalmia. (*Gaz. des Hôp.*, 1879, p. 31.)

782. HAAB. Tuberculosis of the conjunctiva. (*A. f. O.*, vol. xxv, 4, p. 165. Comp. bibliogr., No. 752.)

783. HÄNSELL. Contributions to the knowledge of tuberculosis of the conjunctiva, from clinical observations. (*A. f. O.*, vol. xxv, 4, pp. 11, 38 and 48; and *Inaug.-Dissert.*, Dorpat, 1879. Comp. bibliogr., No. 753.)

784. HIRSCHBERG. Tuberculosis of the conjunctiva. (*Berl. Klin. Wochenschr.*, No. 46.)

785. HOTZ. Traumatic aneurysm in the eyelid, following an operation for trichiasis. (*The Med. Record.*, vol. xv, No. 24, 1879.)

786. HULKE. Punctiform hæmorrhages in the skin and conjunctiva after a severe contusion, with symptoms of suffocation. (*Med. Times and Gaz.*, No. 1538.)

787. LOPEZ-OCAÑA. La conj. catarrho-granulosa y la neoplastica. (*Gaz. Méd. de Cataluña*, Aug. 10, 1879.)

788. MOORE, W. OLIVIER. Ophthalmia neonatorum. (*The Med. Record*, vol. xvi, No. 12, p. 272, New York, 1879.)

789. NETTLESHIP. Diphtheritic conjunctivitis. He does not approve of *v. Graefe's* distinction between diphtheritic and croupous ophthalmia; it is rarely complicated with diphtheritis of the pharynx, but a pathological condition of the pharynx predisposes to diphtheritic conjunctivitis. (*Brit. Med. Jour.*, Aug. 30, 1879. Comp. *Hirschberg's* remarks in *C. f. A.*, 1879, p. 382.)

790. TERRIER. Granular ophthalmia. (*Gaz. des Hôp.*, vol. x, p. 77.)

791. UHTHOFF. Formation of cysts in the conjunctiva. (*Berl. Klin. Wochenschr.*, No. 49.)

792. VACARY, CH. Des conjunctiv. de nature arthritique ou herpétique. (*Thèse de Paris*, 1879, p. 48.)

CORNEA.

793. BRIÈRE. Reflex-keratitis after an injury of the orbital region of the same side. (*A. d'O.*, vol. lxxxii, 1–2, July–Aug., 1879.)

794. GAYET. Hypopyon. (*Lyon. Méd*, Apr. 6, 1879.)

795. HANSEN. The classification of inflammations of the cornea and their treatment. He distinguishes: 1. Keratitis with a tendency to destroy the membrane; 2. Inflammation without this character; 3. Neuroparalytic keratitis. (*Hosp. Tidende*, 1879, Nos. 11 and 12. *C. f. A.*, vol. iii, p. 370.)

796. HIGGENS. Diseases of the cornea. Lecture continued. (*Med. Times and Gaz.*, No. 1515, 1879.)

797. v. HOFFMANN. Herpes zoster ophthalmicus, observed during an epidemic of herpes zoster. (*Ber. d. Naturf.-Vers. z. Baden-Baden*, 1879. *Z. M.*, vol. xvii, p. 489.)

798. HUTCHINSON. A case of interstitial keratitis with deafness. (*The Lancet*, vol. i, 1879, p. 620.)

799. LOPEZ-OCAÑA. Monogr. dobre les inflammaciones de la cornea. He uses a 1 per-cent. solution of chrysophanic acid. (Madrid, 1879, p. 75.)

800. MARTIN, GEORGES. The keratitis of harvesters. It is

the same process as hypopyon keratitis or ulcus serpens. (*Intern. Med. Congr.*, Amsterdam, 1879. *C. f. A.*, vol. iii, p. 312.)

801. MEIGHAN. Melanotic sarcoma of the conjunctiva and cornea. Relapse three times; it had been extirpated six, resp. 1½ years previously. (*Glasg. Med. Journ.*, Aug., 1879.)

802. PIÉCHAUD. Keratitis suppurativa. Hypopyon and sloughing of the cornea. (*Gaz. des Hôp.*, pp. 82 and 103.)

803. QUAGLINO and GUAITA. A case of corneal fibroma, recurring after extirpation. (*Ann. di Ott.*, 1879, Nos. 2 and 3.)

IRIS, CILIARY BODY, CHOROID, AND SYMPATHETIC OPHTHALMIA.

804. ANGER. Tuberculosis of the iris. (*Progr. Méd.*, July 12, 1879.)

805. BOUCHERON. Traitement de l'ophthalmie sympathique par la section des nerfs optique et ciliaires. (*Progr. Méd.*, No. 34. *Soc. de Biol.*, Aug, 9, 1879.)

806. FOURNET. The influence of warmth and light on the development of choroiditis. (*Rec. d'Ophth.*, July, 1879, continued. Comp. bibliogr., No. 292.)

807. HUTCHINSON. A case of destructive double iritis without any assignable cause. (*The Lancet*, vol. i, 1879, p. 619.)

808. LANDESBERG. Idiopathic neuralgia of the ciliary body of both eyes. (*Z. M.*, 1879, p. 280.)

809. OELLER. Retinitis and purulent cyclitis in cerebrospinal meningitis. (*A. f. A.*, vol. viii, p. 357.)

810. PARINAUD. Tubercules de l'iris. (*Rev. Méd. Franç. et Étrang.*, No. 27, p. 14.)

811. PUFAHL. Two cases of double-sided corectopia. Literature. (*C. f. A.*, vol. 3, p. 293.)

812. QUAGLINO and GUAITA. A case of melanotic sarcoma of the ciliary body, of traumatic origin, recurring three times. (*Ann. di Ottal.*, 1879, 2 and 3.)

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813. BEAVER, DANIEL. A case of sympathetic ophthalmia. (*Phila. Med. Surg. Rep.*, vol. lx, p. 225.)

814. GOLDZIEHER. Sympathetic ophthalmia. He observed changes especially in the nerves in the choroid, and therefore assumes that the inflammation is propagated by the ciliary nerves. (20. *Vers. Ungar. Aerzte u. Naturf.*, Aug. 29, 1879, Gyógyászat. *C. f. A.*, vol. iii, p. 363.)

815. McGillavry. Pathogenesis of sympathetic ophthalmia by direct transmission of the inflammatory products through the subdural and arachnoidal lymph-spaces. (*Intern. Med. Congr.*, Amsterdam, 1879. *C. f. A.*, vol. iii, p. 312.)

816. Meighan and Hunter. A case of sympathetic iridocyclitis, improved by a seton. (*Glasg. Med. Journ.*, July, 1879.)

817. Renton, Crawford. Enucleation for sympathetic ophthalmia. (*Ophth. Hosp. Rep.*, vol. ix, 3, p. 342.)

818. Steinheim. Report of sympathetic ophthalmia, with microscopic examinations. Five very instructive cases. (*A. f. Aug.*, vol. ix, p. 43. Will appear in the English edition of these Archives.)

819. v. Wecker. Sympathetic ophthalmia. (*Gaz. des Hôp.*, p. 64, 1879.)

GLAUCOMA.

820. Brailey. A further contribution to the pathology of increased tension. (*Ophth. Hosp. Rep.*, vol. ix, 3, p. 379.)

821. Brière. An anomalous case of acute glaucoma, complicated with congenital coloboma of the upper lid. (*Rec. d'Ophth.*, 1879.)

822. Heisrath. The causes of glaucoma. Experimental studies by closing the anterior excretory channels; he cauterized the sclero-corneal margin in the same manner as *Schöler* had done in his experiments. (*C. f. Med. W.*, 1879, No. 43.)

823. Oglesby. Case of double glaucoma, iridectomy, curious escape of the opaque lens matter. (*The Lancet*, vol. ii, 1879, No. 9.)

824. Power. Glaucoma. He thinks that nervousness and rheumatism are frequent causes. (*Brit. Med. Jour.*, Aug. 30, 1879.)

825. Smith-Priestly. Glaucoma: its causes, symptoms, pathology, and treatment. (*J. A. Churchill*, London, 1879, 280 pages.)

826. Webster, D. Three cases of glaucoma: 1, Gl. simpl. in a girl ten years old; 2, Gl. with keratoglobus at the same age; 3, Gl. simplex with old opacities on both corneæ. Considerable improvement of vision after injections of strychnine. (*Med. Rec.*, vol. xvi, No. 16, p. 370.)

RETINA AND FUNCTIONAL DISTURBANCES.

827. ABADIE. Cases of congenital blindness which disappears after birth. (*L'Union*, p. 85, 1879.)

828. ANGEAR. 48 hours of blindness at the parturient period. 12 hours before the confinement, absolute amaurosis; 24 hours later, perception of light; after the lapse of again 12 hours, absolute recovery of sight without any objective changes. (*St. Louis Med. Surg. Jour.*, vol. xxxvi, 1879.)

829. BEAUMETZ, DUJARDIN ET ABADIE. Hysterical blindness, cured by the application of electricity. (*Progr. Méd.*, No. 28. *Gaz. des Hôp.*, Nos. 55 and 56.)

830. BERGER. Patellar-reflex. He examined 84 blind persons; of 9 patients with atrophy of the optic nerves, 2 did not show the reflex. Among 1,400 healthy persons it was absent in 22 cases, *i. e.*, in 1.56 per cent. (*C. f. Nervenhlk.*, 1879, No. 4.)

831. BERLIN. Visual disturbances after injuries to the skull by blunt instruments. They are mostly one-sided, occur suddenly, mostly as amaurosis, and are incurable. Among 126 cases there were 89 fractures of the base of the skull, and of 80 fractures of the orbit there was in 54 a lesion of the optic foramen, and in 42 cases hæmorrhage into the optic nerve sheath. The rare double-sided disturbances of vision are not so much due to fracture of both canals as to fracture of the sella turcica. (*Ber. der Ophth. Ges. z. Heidelberg*, 1879, p. 9.)

832. COHN. Tobacco-amblyopia. It would certainly be advisable not only to ask the quality and number of cigars, but also their weight. (*C. f. A.*, vol. iii, p. 300.)

833. CROCKER. A case of right-sided hysterical hemianæsthesia without disturbance of vision; metallo-therapeutics. (*Brit. Med. Jour.*, July 5, 1879.)

834. DMITROWSKY and LEBEDEN. A case of right-sided hemiopia. Monoplegia facialis dextr. Hæmorrhage and softening in the left hemisphere. (*Mediz. Westnik*, No 46, 1879.)

835. ELSBERG. The ophthalmoscopic picture in hydrocephalus of horses. (*Ber. d. Ophth. Ges. z. Heidelberg*, 1879, p. 198.)

836. FERNANDEZ SANTOS. Hyperæsthesia of the retina in general and some cases observed on the island of Cuba after the eclipse of the sun of June 29, 1878. (*Crónic. Ophthal.*, No. 10. *C. f. A.*, vol. iii, p. 339.)

837. FRIEDLÄNDER, C. A case of multiple leucocythæmic

neoplasms in the brain and retina, with the clinical symptoms of a cerebral tumor. (*Virch. Arch.*, vol. lxxviii, 2.)

838. GLASCOTT. Amaurosis fugax without any demonstrable cause in a miner, occurring during work ; 12 days later recurrence of sight. (*Brit. Med. Jour.*, July 19, 1879.)

839. HERTER. A case of embolism of a branch of the central retinal artery in a girl 19 years old, the embolus being slowly pushed forward and without lasting defect of vision. (*C. f. A.*, vol. iii, p. 229.)

840. HIRSCHBERG. Tobacco- and alcohol-amblyopia. (*Brit. Med. Journ.*, Aug. 30, 1879. *C. f. A.*, vol. iii, p. 235.)

841. HORSTMANN. Detachment of the retina. Statistical communication. Among 18,000 patients it was observed in 120, *i.e.*, 0.7 per cent. ; it was never seen below 10 years. 82 were myopes. Of 109 cases of partial detachment, 69 eyes had a more or less developed posterior staphyloma. (*Ber. d. Naturf.-Vers. z. Baden-Baden*, Sept., 1879.)

842. HOTZ. Notes on intra-ocular lesions produced by sunstroke. (*Amer. Journ. of Med. Sc.*, July, 1879.)

843. HUTCHINSON. Clinical groups of cases of amaurosis : 1, neuritis after otorrhœa, 4 cases ; 2, after lesions of the cranium or of the trigeminus nerve, 19 cases ; 3, by pressure of intra-orbital tumors, 3 cases ; 4, neuritis, cause unknown, kidney disease, from rheumatic diathesis with 31 cases ; 5, progressive amaurosis with atrophy of the optic nerves in mental disease, 10 cases ; in spinal disease, 13 cases ; hereditary atrophy, 10 cases ; nicotine-intoxication, 8 cases ; 6, atrophy of the optic nerve with paralysis of the orbital nerves, 6 cases ; 7, atrophy in old age, 6 cases ; 8, one-sided atrophy, or occurring on both sides in long intervals, 45 cases ; 9, embolism, 7 cases ; 10, hæmorrhage into the optic nerve, 7 cases ; 11, neuro-retinitis in lead-poisoning, 7 cases ; 12, after erysipelas and herpes zoster, 1 case ; 13, after uterine and ovarian diseases, etc., 11 cases. (*Ophth. Hosp. Rep.*, vol. ix, 3, p. 275.)

844. JASTROWITZ. Disturbances of vision after injuries of the brain ; hemianopsia. (*Allg. Zeitschr. f. Psych.*, vol. xxxvi, 5.)

845. LASÈQUE. The impairment of vision in alcoholism. (*Arch. Génér.*, vol. iv, p. 342.)

846. MAUTHNER. Hemiopia. He tries by clinical and pathological observations and experiments to prove the crossed hemiopia in destruction of the opposite side of the cerebrum ; he

considers the partial decussation of the optic-nerve fibres in the chiasm as proved. (*Med. Chir. Rundschau*, 1879, p. 713.)

847. MORANO. Pathogenesi e cura del distacco (separation) retinico. (*Giorn. d. Mal. degl' Occhio*, vol. ii, p. 29.)

848. NORRIS. The ophthalmoscope in diseases of the nervous system. (*Med. News*, 1879.)

849. PARENTEAUX. De la cécité congénitale sans lésions, ayant guéri quelques mois après la naissance. (*Thèse de Paris*, 1879.)

850. ROSENTHAL. The achromatoptical amblyopia of hysterical patients. (*Wiener Med. Presse*, 1879.)

851. SCHIESS-GEMUSEUS. Snow-blindness. He describes it as a blepharospasm with moderate conjunctivitis. (*A. f. O.*, vol. xxv, 3, p. 173.)

852. SCHIRMER. Amaurosis after blepharospasm. (*Z. M.*, 1879, p. 349.)

853. TREITEL. The value of measurements of the visual field with pigments to determine diseases of the nervous apparatus. He speaks of the disturbances in glaucoma, retinitis, neuro-retinitis and choroiditis, where the impairment of function can only be brought about by secondary atrophy of the optic nerve. He speaks further at length of lateral hemianopsia and the literature on that subject. (*A. f. O.*, vol. xxv, 3, p. 1-110.)

OPTIC NERVE.

854. BRAILEY. Tumor implicating the anterior lobe of the brain and the optic nerve. (*The Lancet*, vol. ii, No. 25. *Med. Times and Gaz.*, No. 1540.)

855. ERB. Diseases of the optic nerve in myelitis dorsalis. (*Arch. f. Psych.*, vol. x, 1.)

856. FIEUZAL. Retinal hæmorrhages at the yellow spot with atrophic excavation of the optic disc. (*Gaz. des Hôp.*, 1879, No. 4.)

857. FUCHS. Heredity of neuritis. He adds 3 families with this affection to those thus far known: 1, of 8 children, the parents neither consanguineous nor luetic, 4 girls and 1 boy healthy, in 3 boys, neuritis; 2, of 6 children, 2 sons amblyopic, the 4 daughters healthy, but one of the latter had 5 sons amblyopic and 1 daughter healthy; 3, in another family 3 sons were amblyopic. Thus in 3 families there were 13 amblyopic persons. (*Z. M.*, 1879, p. 332.)

858. GALEZOWSKY. Sur les atrophies traumatiques de la papille optique. (*Gaz. Méd. de Paris*, No. 51, 1879.)

859. HIGGENS. A case of fibroma of the optic nerve in a girl 5 years old. (*Brit. Med. Journ.*, Oct. 18, 1879.)

860. HIRSCHBERG. Two cases of affection of the optic nerve in cerebral tumor. (*Berl. Med. Gesellsch.*, Nov. 11, 1879. *Berl. Klin. Wochenschr.*, No. 47.)

861. HUNTER. Embolism of the left central retinal artery. Insufficiency of the mitral valve; hypertrophy of the heart. (*Glasg. Med. Journ.*, Aug., 1879.)

862. LANDESBERG. Double descending neuro-retinitis after great loss of blood. (*Z. M.*, 1879, p. 283.)

863. NIEDEN. Four cases of coloboma of the sheath of the optic nerve, without additional fissure in the uveal tract. (*A. O.*, vol. viii, p. 501.)

864. OBTUTOWICZ. Traumatic optic neuritis. (*Przegl. Lek.*, 1879. *C. f. A.*, vol. iii, p. 229.)

865. OGLESBY. Inflammation of the optic disc. (*Brit. Med. Journ.*, June 7, 1879, p. 853.)

866. PARINAUD. De la névrite optique dans les affections cérébrales. 1. A case of hydrocephalus with double neuritis. 2. Tumor of the cerebellum; double neuritis with normal acuteness of sight. 3. Tumor of the left frontal lobe without neuritis. 4. Multiple tubercles of the brain and hydrocephalus; choked disc in both eyes. 5. Fracture of the skull; hæmorrhage into the pia mater, the fourth ventricle and the subvaginal space of the optic nerve; slight opacity of the optic discs. The author comes to the conclusion that the different intracranial affections can produce choked disc only when combined with hydrocephalus. The latter must even be considerable, and find a sufficient resistance from the bones that the intracranial pressure may become increased. It has no immediate relation to the intra-ocular circulation. *Schwalbe's* theory of migration is not sufficient to explain all cases. (*Ann. d'Ocul.*, vol. lxxxii, p. 5.)

867. REICH, THOMAS. Embolism of the central retinal artery. (*Glasg. Med. Journ.*, xii, p. 142.)

868. STEFFAN. On the connection of the diseases of the optic nerve and the spinal marrow. He speaks of the thus far isolated observation of an acute process in the spinal cord, which at first showed itself at different periods as a periodical amaurosis, and then, analogous to the well-known processes in chronic degenera-

tion of the spinal cord (tabes and multiple sclerosis), passed over to the dorsal medulla and terminated in almost entire recovery. (See the communication of Dr. H. D. Noyes, p. 199 of this volume. ED.) (*Ber. d. Ophth. Ges. z. Heidelberg*, 1879, p. 90.) Comp. *Erb.* The coincidence of optic neuritis and subacute myelitis. He speaks of the same case. (*Arch. f. Psych.*, vol. x, p. 146.)

VITREOUS BODY.

869. AUQUIER. Contribution à l'étude du décollement hyaloïdien. (*Congrès de Montpellier*, 1879.)

870. CIACCIO. Complete ossification of the vitreous body of the human eye. (Memorie dell' Accad. di Scienze dell' Istit. di Bologna, S. iii, 10. *C. f. A.*, vol. iii, p. 344.)

871. FOURNET. De la persistance du cordon hyaloïdien. (*Rec. d'Ophth.*, Sept., 1879.)

872. NORRIS. Vascular neoplasm in the vitreous, starting from the optic disc. (*Transact. Amer. Ophth. Soc.*, 1879.)

873. PAGENSTECHER, HERMANN. Anterior detachment of the vitreous body and its relation to the formation of cataract and its operation. (*Ber. d. Ophth. Ges. zu Heidelberg*, 1879, p. 221.)

874. WOLFE thinks that the excessive use of tea is one of the causes of fluidity of the vitreous, and ascribes the injurious influence to tannin. (*Brit. Med. Assoc.*, Cork, Aug., 1879.)

LENS.

875. CARRÉ. De la cataracte noire. (*Gaz. d'Ophth.*, P. 1879, vol. i, p. 51–56.)

876. DEUTSCHMANN. The pathogenesis of cataract. Continued. III. Cataracta nephritica. (*A. f. O.*, vol. xxv, 4, p. 247.)

877. FREYER, P. Observations on cataract in India, with an analysis of 512 cases operated in the Azamgash Hospital during the year 1878. 9 of the patients were syphilitic, 2 had diabetes, 6 had amaurosis, besides the cataract. (*The Lancet*, Nos. 9 and 10, Aug., 1879.)

878. GJERSING. Frequent occurrence of cataract in a peasant family. Among 26 members of the family 20 had cataract. (*Ugeskrift f. Läger*, R. 3, B. 26, No. 18.)

879. GRAEFE, A. Congenital hard cataract. (*Ber. d. Ophth. Ges. zu Heidelberg*, 1879, p. 25.)

880. HOVEN. Subconjunctival luxation of the lens. (*Inaug. Dissert.*, Bonn, 1879. *C. f. Chir.*, 1879, No. 35.)

881. JANY. Two cases on double diabetic cataract, operated by suction, with some remarks on the operative procedure and the formation of diabetic cataract. (*A. f. Aug.*, vol. viii, p. 263. Will appear abridged in these ARCHIVES.)

882. MORTON, STANFORD. Congenital displacement of both lenses occurring in several members of one family. (*Ophth. Hosp. Rep.*, vol. ix, 3, p. 435.)

883. D'OENCH. Contributions to the knowledge of congenital ectopia lentis. (*A. f. Aug.*, vol. ix, p. 31. Will appear in the next number of these ARCHIVES.)

884. PÉDEBIDON. Contribution à l'étude du déplacement traumatique du cristallin. (*Thèse de Paris*, 1879, p. 79.)

885. ROMIÉE. Cataract after typhus, variola, etc. (*Rec. d'Ophth.*, Octob., 1879.)

ACCOMMODATION AND REFRACTION.

886. BERLIN. Anomalies of refraction and accommodation in the eyes of animals. He found the eyes mostly hypermetropic, in four horses myopic. In most of the larger animals there was irregular astigmatism of the lens. (*Ber. d. Naturf.-Vers. zu Baden-Baden*, 1879.)

887. BIESINGER. Researches on the relations between accommodation and the convergence of the lines of fixation. (*Inaug.-Dissert.*, Tübingen, 1879.)

888. DERBY, HASKET. The influence of 4 years of study upon the refraction. Of 50 per cent. E., 5 H. and 44 M. there resulted 26 per cent. E., 13 H. and 50 M. (*Transact. Amer. Ophth. Soc.*, 1879.)

889. FICK. The connection between myopia and divergent squint. (*Bresl. Arztl. Zeitschr.*, vol. i, No. 5.)

890. GRAEFE, A. Myopia and divergence. Against the view of *Donders*, he maintains his theory that th eslight demand on the accommodation which naturally exists in the myopic eye, is the main cause of the latent divergence. (*Bresl. Ärztl. Zeitschr.*, vol. i, No. 7.)

891. HORSTMANN. The refraction in children of ½ to 2 years of age, examined under the influence of atropine. Of 96 eyes 74 were hyp., 13 emm., 9 myopic. The latter were all children of myopic parents. (*Ber. d. Ophth. Ges. z. Heidelberg*, 1879, p. 239.)

892. NAGEL. The ophthalmoscopic picture in myopic eyes.

The crescent on the nasal margin of the disc occurs more frequently than is generally supposed, and it is of a different character than that on the temporal side. (*Ber. d. Naturf.-Vers. z. Baden-Baden*, 1879.)

893. NICATI. La myopie dans les écoles de Marseille, 3434 examinations. The Israelites showed a higher percentage of M. than the Christians. Brown and black eyes are noted with 11 per cent., blue and gray eyes with 18 per cent. (*Gaz. Méd. de Paris*, No. 38.)

894. RAVÀ. Acute spasm of accommodation after neuralgia of the trigeminus. (*Ann. di Ott.*, 1879, Fasc. iv.)

895. WEISS. A new ophthalmoscopic alteration in the myopic eye. Upon the examination with too weak a correcting lens, we observe at the inner margin of the disc, more or less distinctly, a small curved white stripe, which becomes less marked if we make the background more distinct by stronger correcting lenses. The greater the distance of the curved stripe from the margin of the disc, the higher the degree of myopia. This stripe is not rarely seen in young emmetropic and hypermetropic persons, but these eyes are sure to become myopic. (*Ber. d. Naturf.-Vers. zu Baden-Baden*, Sept., 1879.)

OCULAR MUSCLES.

896. BERGER found that in 32 cases of ordinary hemiplegia, there was a distinct but inconsiderable participation of the orbicularis muscle. The facial nerve must therefore have a cortico-bulbar bundle of fibres which comes from the cortex cerebri and passes downward through the basal ganglia or the inner capsule. (*C. f. N.*, No. 12.)

897. BOUCHERON. Treatment of periodic convergent squint by mydriatics or myotics without any operative interference. (*Z. M.*, July, 1879, p. 278.) (Was proposed long ago by Dr. J. Green of St. Louis.—ED.)

898. BROADBENT. Lecture on conjugal deviation of the head and eyes as a symptom of cerebral hæmorrhage and other affections. (*The Lancet*, No. 24.)

899. COOPER, ALFRED. De la déviation conjuguée de la tête et des yeux. (Contrib. à l'étude des localisations cérébrales. *Ac. de Méd.*, séance, July 17. *Arch. Génér. de Méd.*, Aug.)

900. CORNWELL, HENRY. Forcible dilatation of the sphincter palpebr. as a means of treatment in obstinate cases of blepharospasm. (*Med. Rec.*, vol. xvi, 13.)

901. DRAUSAART. The nystagmus of miners. He does not think that there is any connection with general disease. (?) (*Intern. Med. Congr.*, Amsterdam, 1879. *C. f. A.*, vol. iii, p. 308.)

902. GAJKIEWICZ. Central paralysis of the abducens nerve of one eye with associated deviation of both eyes. Explained by *Graux's* examinations. Patholog. condition: Tubercles in the pons. (*Medyc.*, 1879. *C. f. A.*, vol. iv, 1, p. 18.)

903. GROSSET. Conjugate deviation of the eyes. (*Rec. d' Ophth.*, July, 1879.)

904. HEUCK. Congenital hereditary defect of the motions of the eye. A mother and 3 children had a congenital paresis of the levator palpebr., of the superior and inferior oblique, the external rectus and less marked of the internal rectus muscles. The superior and inferior recti only had their full power. By operative interference, and later by anatomical dissection in one case, it was shown that the insertions of some of the muscles were abnormal. (*Z. M.*, vol. xvii, July, p. 253.)

905. JAFFÉ. A cure of paresis of the trigeminus with deep central infiltration of the cornea, caused by gummata at its origin. (*Berl. Klin. Wochenschr.*, No. 43.)

906. LANDOUZY. De la déviation conjuguée des yeux, et de la rotation de la tête par excitation ou paralysie de la 6. and 11. paire etc. He claims that in the former affection the patients direct their eyes and head toward the side of the paralyzed limbs, but that paralytic patients have a tendency to turn their eyes and head toward the affected side of the brain. (*Progr. Méd.*, Nos. 36, 37, 41, 43, 46.)

907. MENZIN. A case of atrophy of the tendon of the internal rectus muscle, noticed during the operation of advancement. (*Rec. d'Ophth.*, Sept., 1879.)

908. NOYES, H. D. A case of paresis of the inferior oblique, caused by a blow. (*Transact. Amer. Ophth. Soc.*, Newport, 1879.)

909. RÄHLMANN presented a case of nystagmus which could be produced at will. (*Ber. d. Naturf.-Vers. zu Baden-Baden*, 1879.)

910. RICHER. De l' influence des agents desthésiogènes sur l' hémianesthésie et l' achromatopsie cérébrales et partic. du phénomène des oscillations consécutives. (*Progr. Méd.*, Nos. 46-48.)

911. SAENGER. Paresis of the oculomotory nerve in tuber-

cular meningitis, produced by peripheral and central hæmorrhage. (*Arch. f. Psych.*, vol. x, 1.)

912. SEELIGMÜLLER. Hereditary ataxia with nystagmus. (*Arch. f. Psych.*, vol. x, 1.)

913. SMITH-PRIESTLEY. Bilateral deviation of the eyes, after a paralysis of the oculomotory nerve which had existed for some years. (*Ophth. Hosp. Rep.*, vol. ix, 3, p. 428.)

914. WILLBRAND. A case of acquired nystagmus, without any assignable cause ; the surrounding objects appeared to move and it varied with different intensities of illumination. (*Z. M.*, vol. xvii, p. 358.)

915. WILLBRAND. A physiological explanation of nystagmus. He tries to explain it by the relation between the middle lobes of the brain, the cerebellum and the cerebral hemispheres, and the relation between these parts and the eye. (*Z. M.*, xvii, p. 419, 461.)

LIDS.

916. CORRADI. Congenital coloboma of the lid with harelip. (*Lo Sperimen.*, vol. xliii, 3, p. 371.)

917. DECÈS. Pustule maligne de la paupière supérieure droite. (*Rev. Méd. Franç. et Etrang.*, No. 36, p. 304.)

918. FALCHI. Two cases of syphilitic tarsitis and one case of tuberculous ulceration of the palpebral conjunctiva. (*Giorn. della R. Accad. de Torrino. C. f. A.*, vol. iii, p. 343.)

919. HOTZ. On the so-called ptosis atonica ; its nature and treatment. It is a prolapse of the skin of the lid, and he operates in the same manner as he does for entropium. (*A. O.*, vol. viii, p. 400.)

920. RENÉ. Cases of epicanthus. (*Gaz. des Hôp.*, 107.)

921. DEL SONZA. The innervation of the lids. He assumes a special motor nerve which produces the winking, and which takes its course into the orbit. (*Period. de Ophth.*, Lissabon, 1879. *C. f. A.*, vol. iii, p. 364.)

922. DE VINCENTIIS. Contribuzione alla tarsite scrofulosa. (*Ann. di Ottal.*, vol. viii, p. 322.)

923. WALZBERG. A case of elephantiasis of the upper lid. (*Z. M.*, 1879, p. 439, with illustr.)

LACHRYMAL APPARATUS.

924. COLLICA, ACCORDINO. A teleangiectatic fibro-sarcoma of the caruncle, the size of a hazel-nut, in a child ; 3 months later,

recurrence and death. (*Communic. Pratiche della Clinic. Ocul.*, Napoli, 2. S., 1, 36, 113. *C. f. A.*, vol. iii. p. 315.)

925. ESPINOSA. Dacryocystite chronique et ses suites. (*Thèse de Paris*, 1879.)

926. FUCHS. Cystoid degeneration of one canaliculus; with illustr. Two cases. (*Z. M.*, vol. xvii, p. 355.)

927. HIGGENS. A case of formation of the mycelium of a fungus in the upper canaliculus. (*Brit. Med. Journ.*, Oct. 18, 1879.)

928. KIPP. Dacryocystitis in infants. He states a larger percentage than is generally assumed. (*Transact. Amer. Ophth. Soc.*, 1879.)

ORBIT.

929. BULL, C. S. Hyperostosis and periostosis of the bones of the orbit. (*New York Med. Journ.*, vol. xxx, No. 5.)

930. GALEZOWSKY. Cases of syphilitic orbital tumors. They are characterized by their rapid development, and are mostly accompanied by periorbital pain and paresis of some or most of the ocular muscles. The optic nerve is rarely affected; atrophy of the od. can be the result. Periostoses and exostoses are rarely limited to the orbit; they occur in acquired and congenital lues. (*Rec. d'Ophth.*, Août., 1879.)

931. JACOBI. Exophth. goitre, occurring in a child, and followed by St. Vitus' dance. (*Med. Record*, vol. xvi, 1.)

932. LINDSLEY, V., of Nashville. A case of osseous tumor, in right orbital cavity, successfully removed with preservation of sight. (*The Med. Rec.*, vol. xvi, No. 6.)

933. PACKARD. A case of intra-orbital sarcoma in a patient 67 years old; it had existed for 32 years. Extirpation, healing with S=1. (*Amer. Journ. of Med. Sciences*, 1879.)

934. ROMIÉE. Cases of exophthalmus: 1. Caused by tenonitis with abscess of the cheek; 2. by periostitis frontalis; 3. on both sides in consequence of thrombosis of the cavernous sinus. (*Rec. d'Ophth.*, Nov. 1879.)

935. SCHLÄFKE. The etiology of pulsating exophthalmus. Upon the *post-mortem* examination of one case where the left carotid had been ligated, and where a rupture of an aneurysm of the carotid in the cavernous sinus was found, he tries to bring all the 14 cases in which an autopsy had been made, under the one head of rupture of the carotid in the cavernous sinus, where,

however, the interpretation of some autopsies seems forced. The rupture can be the consequence of a direct injury, or of a rupture of an aneurysm or of blood-vessels which had been diseased by syphilis or atheromatous degeneration. Literature of 93 cases. (*A. f. O.*, vol. xxv, 4, p. 112.)

936. STEINHEIM. Prolapse of the eyeball from depression of the left frontal bone, with subsequent neuroparalytic sloughing of the eye after a forceps-delivery. (*C. f. A.*, vol. iii, p. 231.)

937. TALKO. The sixth case of a congenital serous cyst of the orbit and microphthalmus. (*Medyc.*, 1879, and *Ber. d. Ophth. Ges. zu Heidelberg*, 1879, p. 105.)

TUMORS.

938. BERGH. A case of orbital cancer. Periosteal alveolar carcinoma. (*Hygiëa*, 1879. *C. f. A.*, vol. iii, p. 370.)

939. BIMSENSTEIN. External melanosarcoma of the eye. (*Rec. d'Ophth.*, Oct., 1879.)

940. CHARON. Tumor of the brain, originating in the orbit. (*Press. Méd.*, vol. xxxi, p. 19.)

941. DYER. A case of sarcoma of the ocular conjunctiva. Recurrence after extirpation; enucleation, death. (*Transactions Amer. Ophth. Soc.*, Newport, 1879.)

942. HIGGENS. A case of fibroma of the optic nerve in a patient 5 years old, and of dermoid cyst of the orbit. (*Brit. Med. Journ.*, Oct., 1879.)

943. KNAPP. Myxomatous gliosarcoma of the optic nerve, the result of an injury. Extirpation; optic neuritis of the other eye nine months later. (*Transactions Amer. Ophth. Soc.*, 1879.)

944. KNAPP. Three cases of successful removal of sarcoma of the iris. (*A. O.*, vol. viii, p. 82.)

945. MANZ. Præcorneal tumor after episcleritis. (*Ber. d. Ophth. Ges. zu Heidelberg*, 1879, p. 44.)

946. MARTIN. Angiectatic nævus of the orbit in a child 1½ years old, extending to the bridge of the nose, cured by electrolysis; seven sittings, six elements. (*Ann. d'Ocul.*, vol. lxxxii, July–August, 1879.)

947. MEIGHAN. A case of melanotic sarcoma of the conjunctiva and cornea. (*Glasg. Med. Journ.*, vol. xii, p. 112.)

948. NORRIS. Recurrent papilloma of the sclero-corneal margin. (*Transactions Amer. Ophth. Soc.*, 1879.)

949. QUAGLINO and GUAITA. 1. Gelatinous leuco-sarcoma of the choroid; 2. fibroma of the cornea, recurred; 3. melano-

tic sarcoma of the ciliary body; recurrence. (*Ann. di Ott.*, 1879, vol. viii, 2–3, p. 254.)

950. RICHET. Extirpation of a melanosarcoma of the choroid and of a papillary sarcoma of the conjunctiva, filling the entire orbit. (*Gaz. des. Hôp.*, 105 and 114.)

951. SCHLEICH demonstrated a case of primary tumor of the ciliary body. (*Ber. der Ophth. Ges. zu Heidelberg*, 1879, p. 208.)

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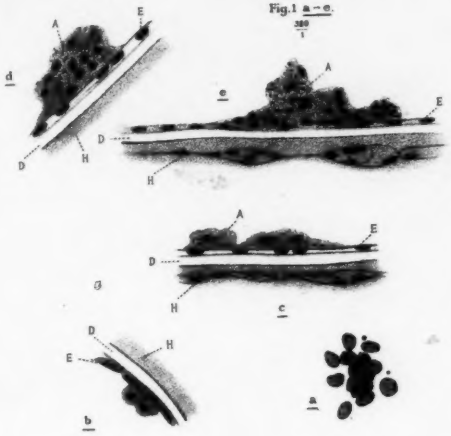
Fig. 1 a – e. $\frac{320}{1}$



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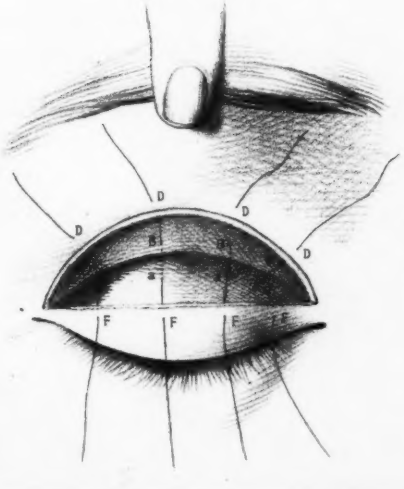

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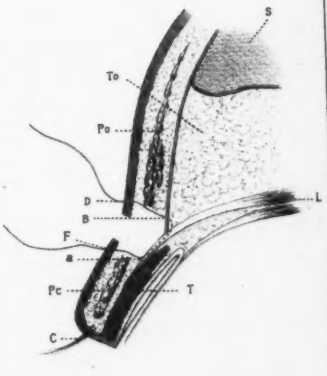

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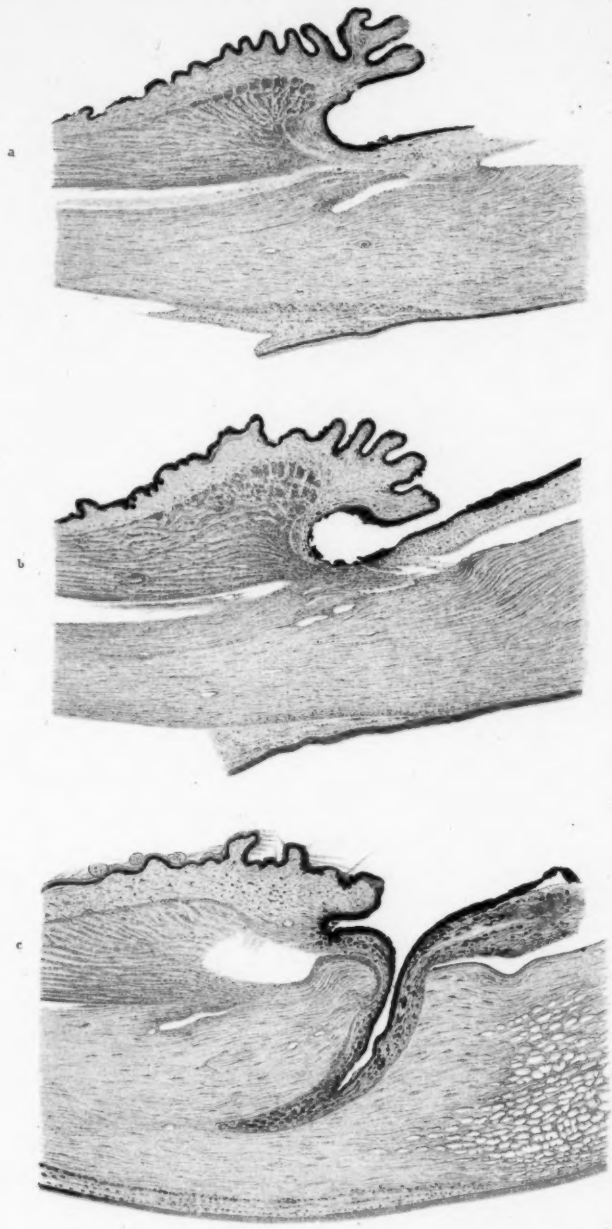
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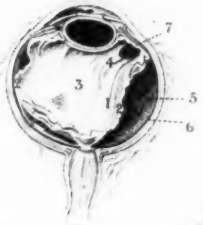

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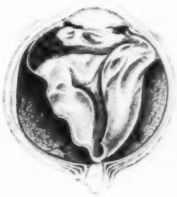

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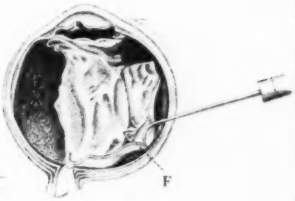

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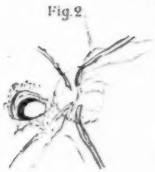

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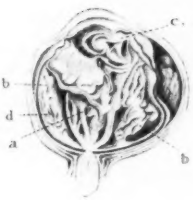

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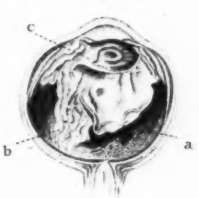

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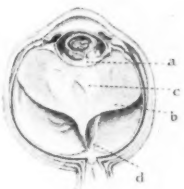

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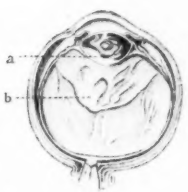

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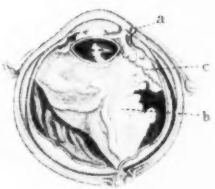

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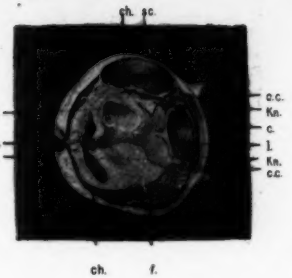

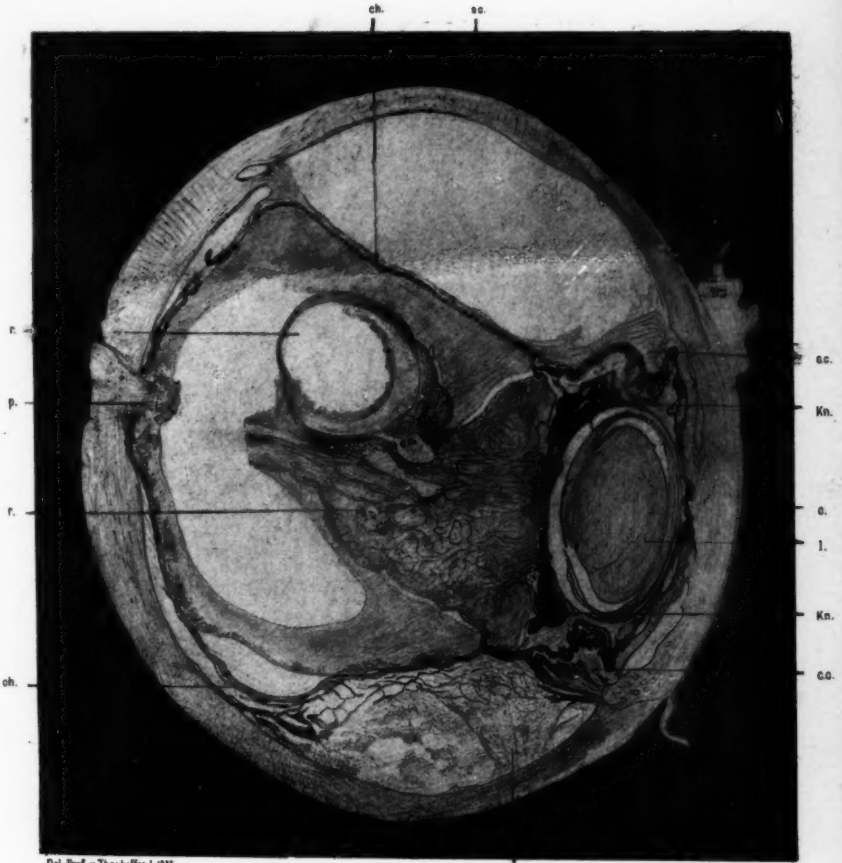

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Fig. B.

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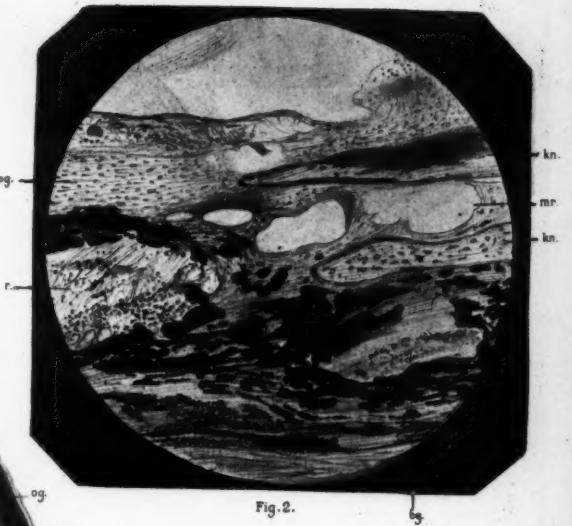

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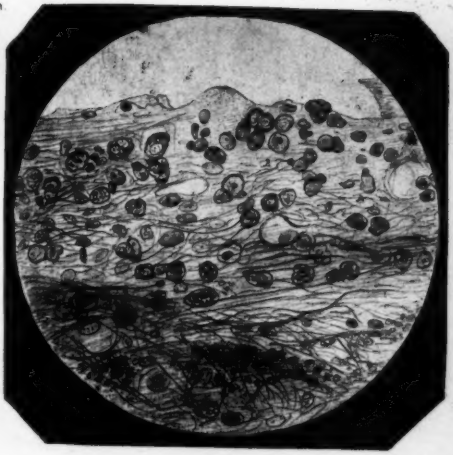

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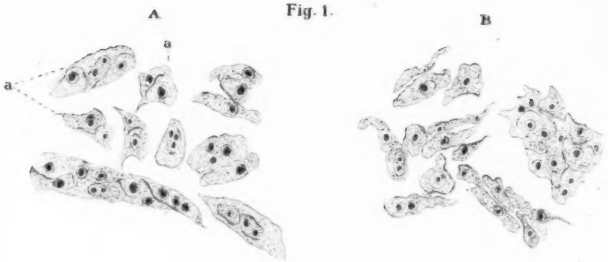

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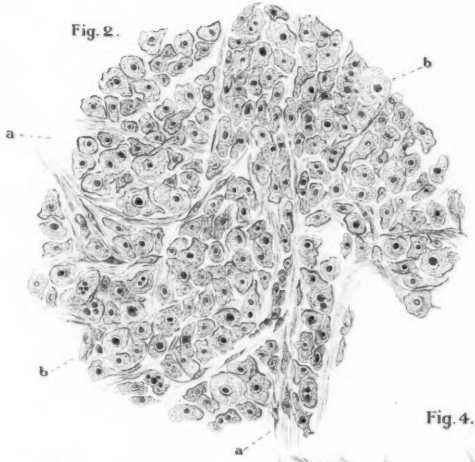

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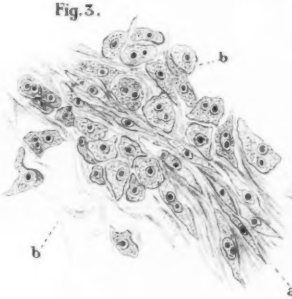

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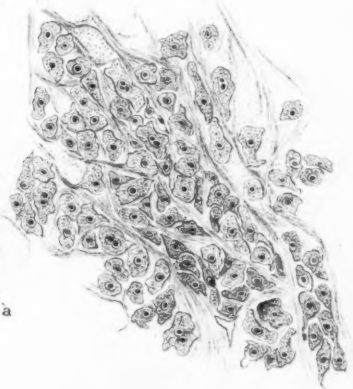

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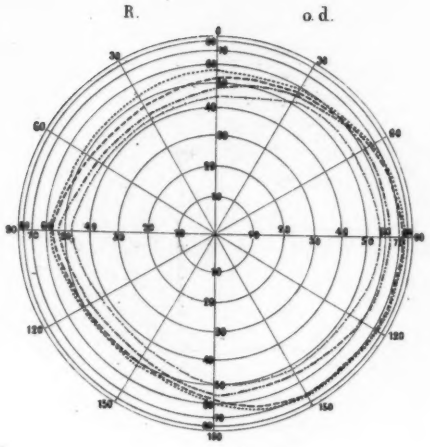

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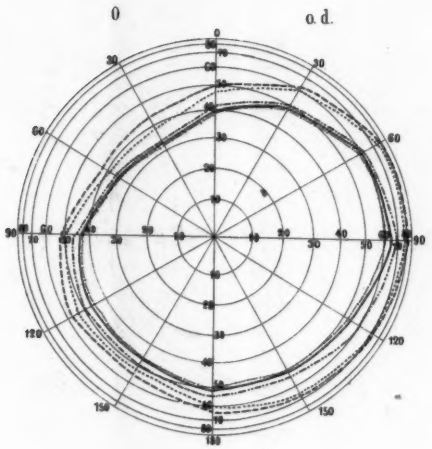

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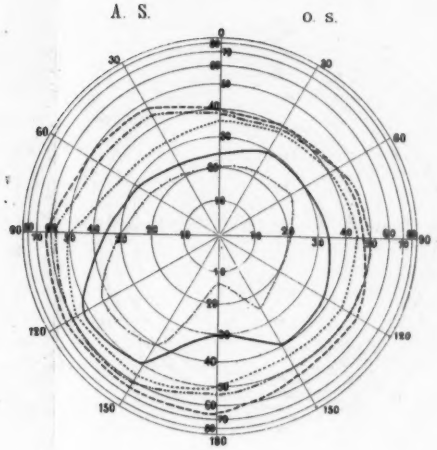

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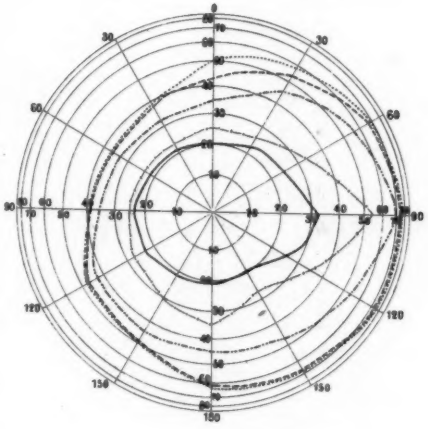

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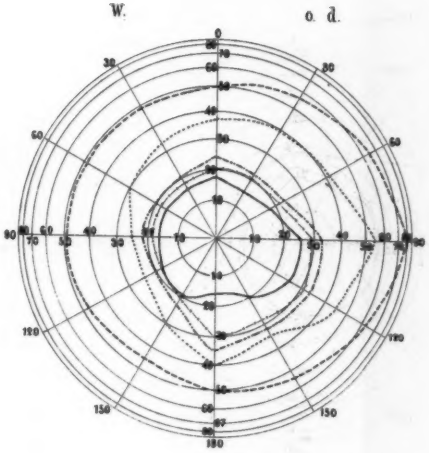

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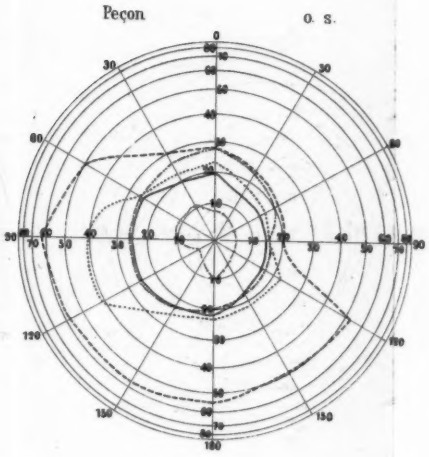

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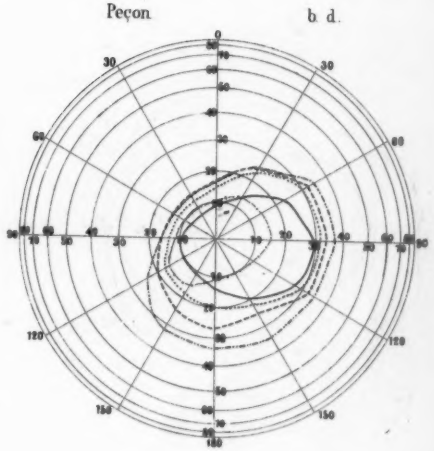

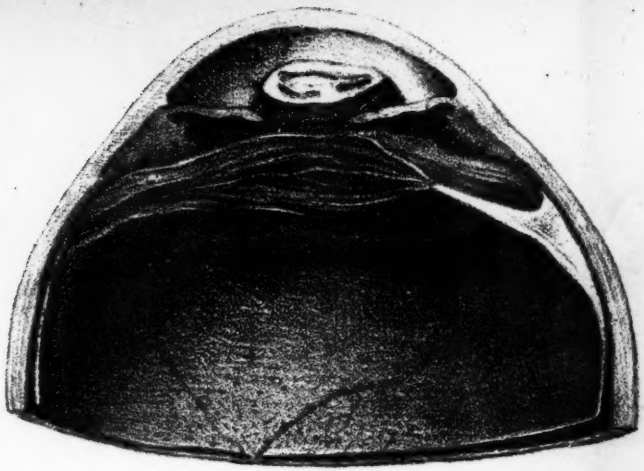

Fig. I

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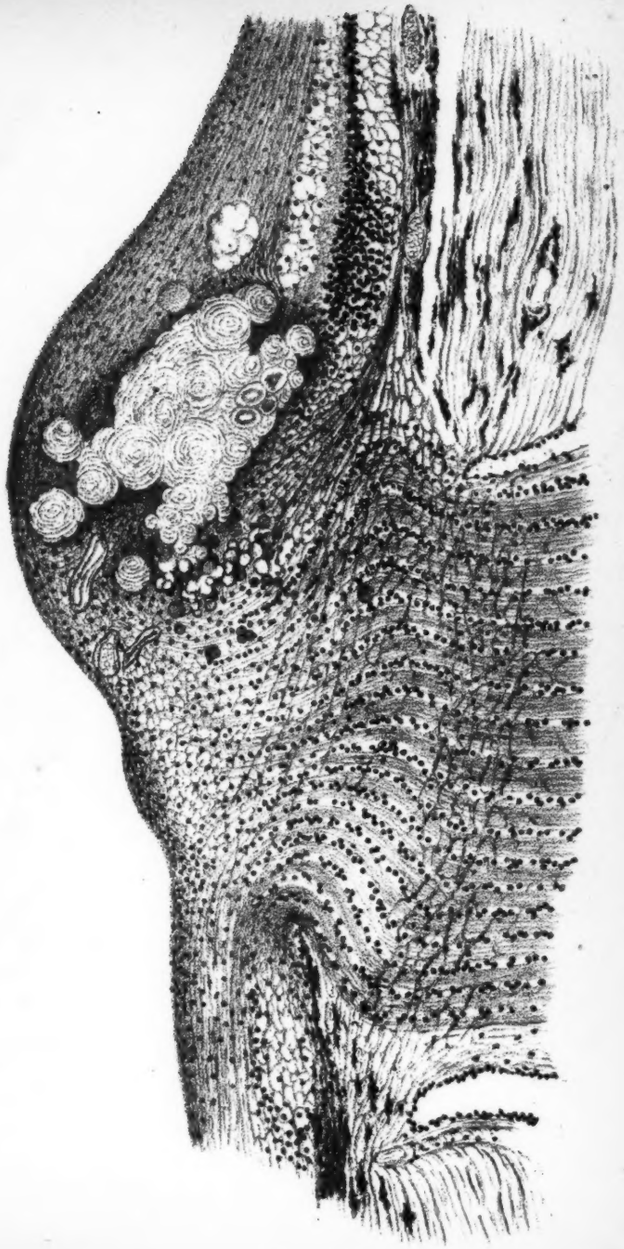

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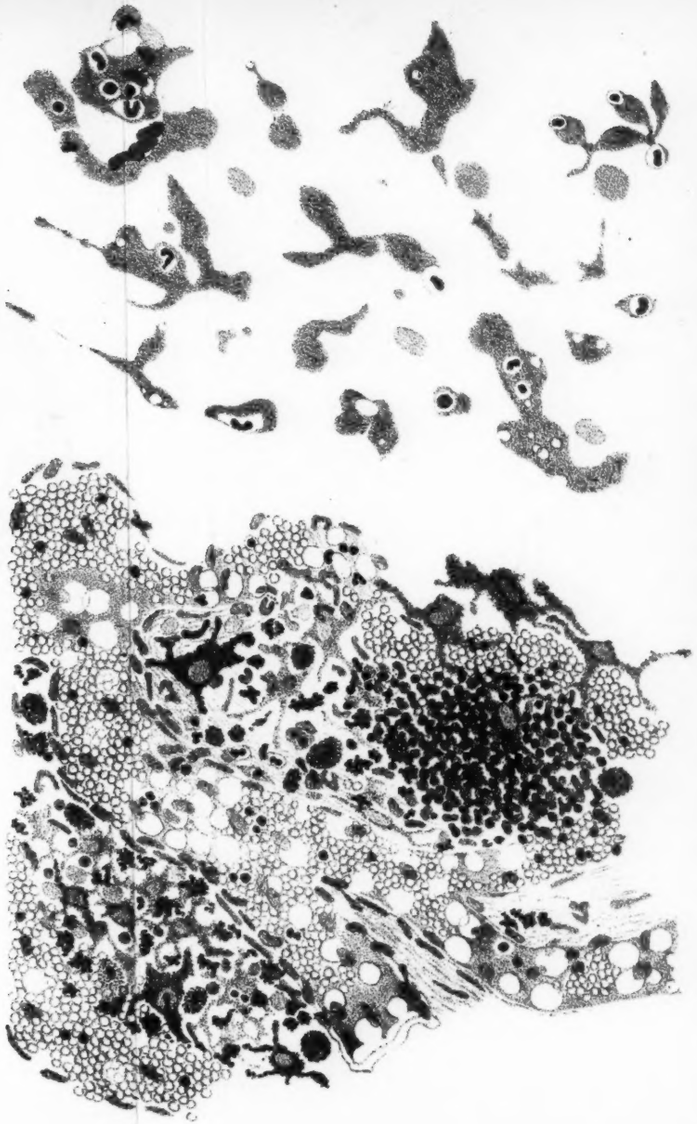

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